

MATERIALS RESEARCH INSTITUTE

SECOND ANNUAL SAFETY REPORT

REPORT COVERING DATES: Spring 2014-Spring 2015

DATE OF LAST REPORT: Spring 2014

EXECUTIVE SUMMARY

This is the Second Annual MRI Safety Report highlighting significant and on-going safety improvements in and around the 51 labs housed in the north wing of the Millennium Science Complex (MSC). The report reflects the efforts of faculty, students, and the MRI Safety Committee (MRI-SC) to make the lab a safe environment for users and north wing occupants. The report encompasses, but is not limited to, these categories: Current Initiatives, Safety Successes, Safety Opportunities, and Future Initiatives.

1. CURRENT INITIATIVES

1.1. Digital Safety Initiative and Training

MRI's Digital Initiative's approach will enhance all aspects of safety and efficiency in safety training in two ways: a Digital Safety Initiative and a Digital Training Initiative. Its vision is to develop interactive digital modules that will serve as the frontline of safety & instrument education for Penn State students, staff, faculty, and visitors. The MRI Safety Committee successfully approached the Vice President for Research (Dr. Neil Sharkey) for support of the Training Modules and is currently working with Environmental Health & Services (EHS) to garner support for the Safety Modules. To date, multiple meetings have been completed with:

- a. Office of the Physical Plant
- b. Environmental Health & Safety
- c. PSU Risk Management
- d. PSU Ethics and Compliance Committee

Current status: EHS and Risk Management are working with PSU leadership to establish protocols for integration of the safety modules into the greater PSU safety needs.

1.1.1 Module Descriptions

1.1.1.1 Safety Modules - The focus of the safety modules is to establish a unified safety training process that improves efficiency and accessibility of safety training within MRI. These modules will be hosted by a new website developed for MRI specifically focused on safety. Safety module topics include two kinds: general safety and lab safety. Examples of general safety are: CDA, DI Water, Hoods, Elevators, Gas Bottles, Chemical Ordering/Shipping and Electrical Hook-up of Equipment. Examples of lab safety are: PPE, Alarms, Chemical Safety, Evacuation Plans, and various Lab Specific Training, i.e., laser, radiation, and waste products.

1.1.1.2 Introduction and Training Modules

Training modules are varied and are described below.



Figure 1 Two Prongs to Digital Initiative

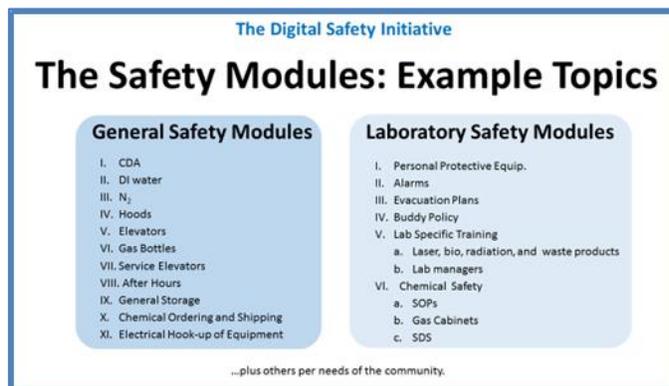


Figure 2 Sample Module Topics

MATERIALS RESEARCH INSTITUTE

SECOND ANNUAL SAFETY REPORT

- **(Student-led, Optional)** While not mandatory, we are encouraging faculty to enlist their students in a digital initiative to introduce visitors, incoming students, and industrial partners to MSC – it could be a great marketing tool for their lab and websites too! The Student Lab Manager Leadership has introduced the concept to all lab managers already, and is preparing to film lab introduction videos for individual MRI labs. Each video will introduce a lab's purpose, its equipment, its safety standards, and its general feel. The primary purpose for these videos is to acclimate students and professional visitors new to the lab to the experience of lab work. Initial test videos (hosted on YouTube) took a total of about 5 hours to accomplish. We have asked the students to do similar videos over the course of 3 months, which should be reasonable to accomplish. All students were provided with an example script, as well as significant levels of guidance from the student leadership during the regular lab manager meeting.

Example Video: <https://www.youtube.com/watch?v=bGNMmcccnBg&feature=youtu.be>

- **(MRI Staff-led)** The focus of the staff-led modules is to enhance accessibility and timeliness of initial trainings (introductions) of equipment within MCL and the Nanofab. Dr. Sharkey (VPR) has agreed to fund this portion of the module development for \$150K over the course of 2 years. The modules have been proposed to be produced by the MRI staff in collaboration with the CoE outreach videographer; however, this process is still under development. Instrument training for users consists of detailed information about the instrument, videos showing how to use it, and safety features.

1.2 Expected Impact of the Digital Initiative

- Enhanced communication of faculty lab capabilities and general safety within their labs
- Expected reduction in cost of safety training and insurance
- Enhanced research and work output
- Enhanced availability of training through 24/7 content access
- Improved efficiency of face-to-face staff training by preparing researchers in advance
- Enhanced reputation of Penn State as a leading institution in research & safety

1.3 Phase 2 of the MRI-EH&S Integrated Safety Plan

Since MRI launched its Safety Initiative in 2012 it has consistently partnered closely with EHS to participate in the Integrated Safety Plan (ISP). ISP is a plan that promotes lab user/employee involvement in workplace safety. MRI-SC is near completion of Phase 2, which further focuses on three core elements: leadership commitment, employee involvement, and a self-review process. Phase 2 is differentiated by identifying program gaps and developing an implementation strategy. When completed, the department continues to remain eligible for indemnity and some cost sharing.

2. SAFETY SUCCESSES

2.1 Increase in Student, Faculty, and Other Members of Safety Committee

The MRI-SC increased its members to include personnel from Environmental Health and Safety (EHS)—Mark Linsenbiger and Mike Houser—as well as Ray Alexander,



Figure 3 MRI Safety Successes

MATERIALS RESEARCH INSTITUTE

SECOND ANNUAL SAFETY REPORT

MSC's Building Engineer. Their knowledge and experience add value to MRI-SC's role and connect the committee to individuals who assist MRI's goal of safety.

Additionally, the following Material Science and Engineering faculty members have partnered with the MRI-SC: Roman Engel-Hebert, Hojong Kim, and Allison Beese. Their role is threefold: to act as liaisons between MatSE and MRI, to communicate safety to their students, and to support the MRI-SC Faculty Lead.

Finally, and most importantly, the MRI-SC increased student member representation to gain student perspective on plans for new safety policies and changes to established ones and to activate student leadership among students themselves—particularly in day-to-day lab operations.

2.2 New Lab Manager Meetings Established

Lab manager meetings are scheduled six times a year. These are student-led meetings but are guided by the MRI-SC and the MRI-SC Faculty Lead, Josh Robinson. They serve as dependable venues for members to address important issues among lab users, lab managers, and the MRI-SC. Topics of these meetings include, but are not limited to: inspection information, inspection preparation, SOPs, Laboratory & Research Safety Plan (LRSP) notebooks, safety compliance, chemical safety, and waste storage.

2.3 On-line Library of Standard Operating Procedures (SOPs) Developed

SOPs are common resources of information for any kind of lab user. The availability of SOPs is necessary for quick reference and for the ease of developing new SOPs. The Safety section on the MRI website consists of completed SOPs and a blank SOP form for developing new SOPs.

2.4 Improvements to MRI's Safety Webpage

The MRI-SC continually updates the Safety section to keep site visitors abreast of activities. This year the following five parts were added: an MRI-SC photo, the violation policy process cited in the case of infractions, Standard Operating Procedures, Near Miss Reporting, and how to submit near misses on-line. Maintaining webpage information is an on-going process.

2.5 EHS Recognition of MRI Progress

EHS has recognized MRI for being leaders in Safety at PSU through public emails to the MRI director and other University leadership. Laudatory efforts include:

- The progress MRI is making when it comes to lab safety, education, and working towards compliance
- Jeff Long's development of an interlock switch to de-energize electrical equipment
- The work of Maria DiCola and Tony Barthel in facilitating the development of a safe-operating-procedure (SOP) library in which SOP templates will be available for others to access and edit for their own work
- The establishment of a "star system" for ranking lab safety

2.6 Student-run Lab Inspections

Our Lab Safety Officers, using an EHS safety inspection sheet, visit each other's labs to see if all safety requirements are met. This year colored stars were introduced to show which sections of the inspection sheet were fulfilled 100%. A lab showing 5 colored stars means that their inspection was 100% in all categories:

GOLD STAR: Lab Documentation (Unit Plan, SOPs, CHIMS, eye wash and Chem waste check sheets)

GREEN STAR: PI and Student Lab Training Certifications (Initial and Yearly Refreshers) and Lab Self-Inspection

MATERIALS RESEARCH INSTITUTE

SECOND ANNUAL SAFETY REPORT

RED STAR: Exposure Control Devices and Personal Protective Equipment (Hoods, Sashes, Working Hood Exhaust, PPE and proper lab dress...no sandals/shorts)

BLUE STAR: Chemical and Infectious Waste, Chemical Storage Laboratory Signs, Info, Equipment, and Security

PURPLE STAR: Life Safety and Emergency Equipment

2.7 Building Occupants Signing Safety Agreement Forms

MRI initiated as standard practice the signing of the MRI Safety Agreement for all North Side building occupants. Signing the agreement is required of new faculty hires, new staff, students, and all employees who work in the MRI. The Safety Agreement, signed by the MRI Director, emphasizes the significance MRI attributes to the practice of safety and to building a culture of safety. Signees agree to follow safety practices and acknowledge the importance placed on safety by MRI.

3. CONTINUING SAFETY PROGRESS and FINDING NEW OPPORTUNITIES

3.1 Digital Safety

Digital Safety at all levels will continue to be a focus throughout the 2015/16 academic year. It is a dynamic project viewed as long-term since it covers a broad spectrum of approaches in planning, developing, and coordination. Opportunities are in the areas of:

- Filming MRI Lab introductions
- Producing instrument training videos
- Engaging appropriate PSU departments/offices that would guide, direct, and partner in planning a comprehensive approach to digital safety.

3.2 Tracking Safety Training

Recordkeeping/tracking the training of individual users continues to be an opportunity. MRI is currently in the process of replacing its Research Instrumentation Management System (RIMS), which has delayed commitment to identifying a tracking software system. It is, however, recognized as an area of high need, and communications continue with EHS and IT to eventually maintain all records in one area.

3.3 Promoting Proper PPE Utilization

Even though the committee has worked hard to ensure a safe environment, there continues to be occasional disconnects in the proper use of safety equipment (gloves, lab coats, etc.).

3.4 Phase 2 of the Integrated Safety Plan

Phase 2 of the ISP is nearly two-thirds complete. It remains an active MRI-SC priority, which receives regular attention.

4. FUTURE INITIATIVES AND GOALS (Strategic Plan)

Outlined and enumerated below are the MRI-SC's 2015 goals:

Continued Safety Education – Following up on the previous section, the MRI-SC recognizes the role of safety education. We will continue to provide education of proper PPE usage through Stall Walls, updated Safety Signage, and personal interactions with students and users. Additionally, listed below are a few examples of additional safety education:

- 4.1 Highlight at each Lab Managers Meeting a safety education point
- 4.2 Conduct random lab checks to facilitate a culture of safety
- 4.3 Continue EHS's Safety Minute at MRI's weekly M-café .

MATERIALS RESEARCH INSTITUTE
SECOND ANNUAL SAFETY REPORT



Figure 4 Fall 2014 MRI Safety Committee

COMMITTEE MEMBERS

Ongoing Members	Title/Department	Role/Duty
Joshua Robinson	Asst. Prof, Materials Science and Engineering Assoc. Dir., Center for 2D & Layered Materials	Committee Chair
David Sarge	MRI Facilities Manager and Safety Director	MSC Safety Director
Josh Stapleton	MCL Operations Manager	
Bob Cornwall	MRI Managing Director	
Colette Orlandi	MCL Administrative Support Assistant	Safety Committee Staff Support
Maria DiCola	MCL Technical Staff	MSC Safety Officer
Chad Eichfeld	Nanofab Research and Development Engineer	Nanofab Safety
Tim Klinger	MRI Engineering Aide	MSC Building Support/Safety Assistant
Jeff Long	MCL Technical Staff	
Mel Hainey	Student Leader Member	Stall Wall Signs
Lizz Michael	Student Leader Member	Lead Lab Manager
Tony Barthel	Student Leader Member	SOPs
Scott Henninger	MatSE Research Equipment Designer	MatSE Liaison Consultant
Bruce Walker	MRI Administrative Support Coordinator	MSC Building Support/Safety Assistant
New Members		
Jason Chan	Student Leader Member	Lead Lab Manager
Mingda Zhou	Student Leader Member	
Ganesh Bhimanapati	Student Leader Member	
Mark Linsenbigler	EHS	
Mike Houser	EHS	
Ray Alexander	OPP Engineer; MSC Building	
Faculty Partners		
Roman Engel- Herbert	Asst. Prof, Materials Science and Engineering	

MATERIALS RESEARCH INSTITUTE
SECOND ANNUAL SAFETY REPORT

Hojong Kim	Asst. Prof, Materials Science and Engineering	
Allison Beese	Asst. Prof, Materials Science and Engineering	
Outgoing Members		
Lizz Michael	Student Leader Member	Lead Lab Manager
Tony Barthel	Student Leader Member	SOPs