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Foundry Safety Management System at Virginia Tech

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ABSTRACT

The Environmental Health and Safety Department at Virginia Tech created a safety management system for the on-campus Kroehling Advanced Materials Foundry. This system was so successful that it was rolled out to the entire University. This paper describes the safety management system and how it is used by students, faculty, and staff at the foundry.

Keywords: occupational health and safety, safety management, foundry safety

INTRODUCTION

The role of the Virginia Tech Environmental Health and Safety Department is to promote a positive, integrated safety culture for the university community, advocate safe and healthy living, learning, and working environments, and help departments comply with local, state, and federal regulations and mandates. When Virginia Tech decided to build the Kroehling Advanced Materials Foundry, the Environmental Health and Safety Department was asked to develop a comprehensive safety management system for the new facility. The system that was developed was so successful that it was eventually rolled out to the entire Virginia Tech University. The Director of the Virginia Tech Foundry Institute for Research and Education, which is located at the Kroehling Advanced Materials Foundry, is responsible for maintaining the foundry safety management system.

FOUNDRY SAFETY MANAGEMENT SYSTEM

The Virginia Tech Safety Management System is on-line and available 24/7. To access the safety management system, faculty, staff, or students go to the Virginia Tech Environmental Health and Safety homepage and click on the Safety Management System link, Figure 1, which takes the user to the lab/workspaces that they are "associated" with, Figure 2. The user then selects the lab/workspace in which they are interested.

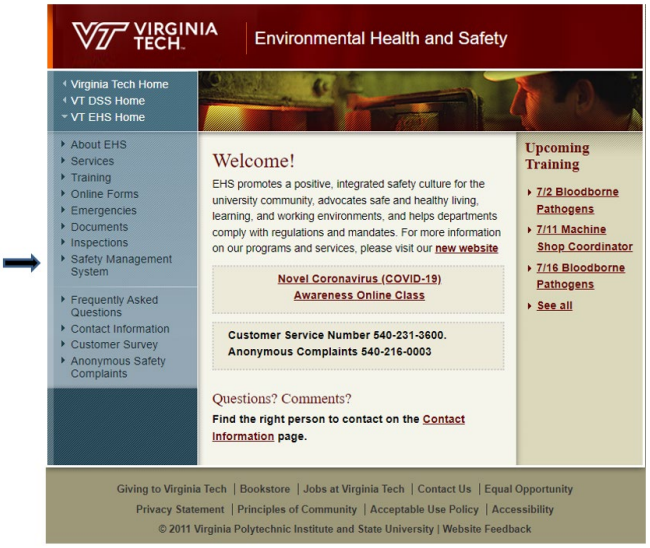

Figure 1. Virginia Tech Environmental Health and Safety Home Page.

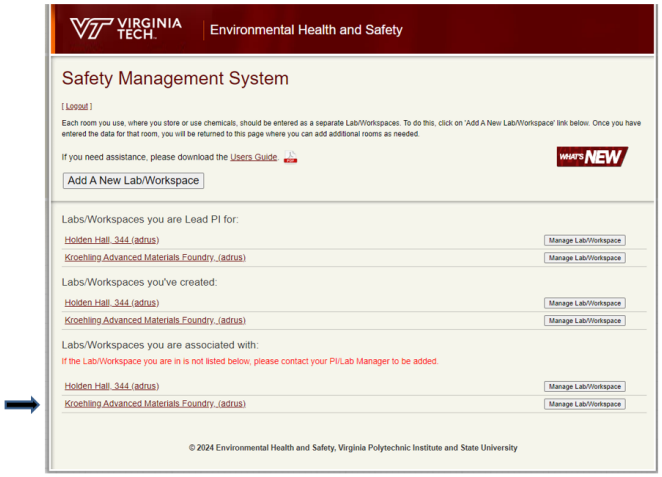

Figure 2. The lab/workspaces that the user is "associated" with.

If the user is not familiar with the Virginia Tech (VT) EHS safety management system, a comprehensive user guide is available, Figure 3.

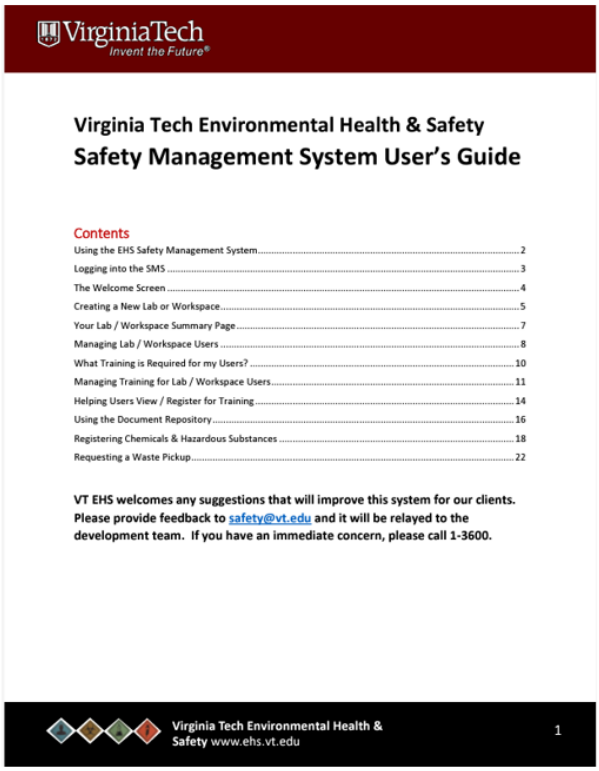

Figure 3. The contents of the "VT EHS Safety Management System User's Guide."

Each lab/workspace in the safety management system has a summary page that contains important information about the lab/workspace and has tabs for various functions, Figure 4. Personally identifiable information has been redacted in Figure 4.

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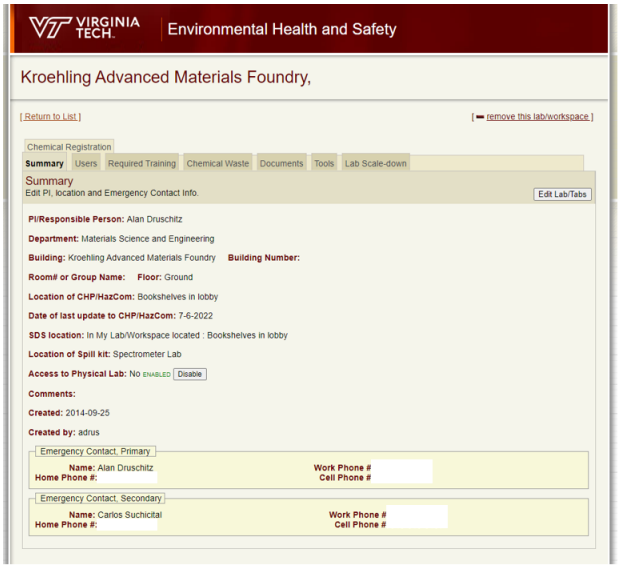

Figure 4. The Kroehling Advanced Materials Foundry "Summary" page.

From the "Summary" page, the user chooses a "tab" that takes them to whatever information they are interested in, such as the lab/workspace "Users," in Figure 5. Only principal investigators or managers can edit user information. Again, personally identifiable information has been redacted.

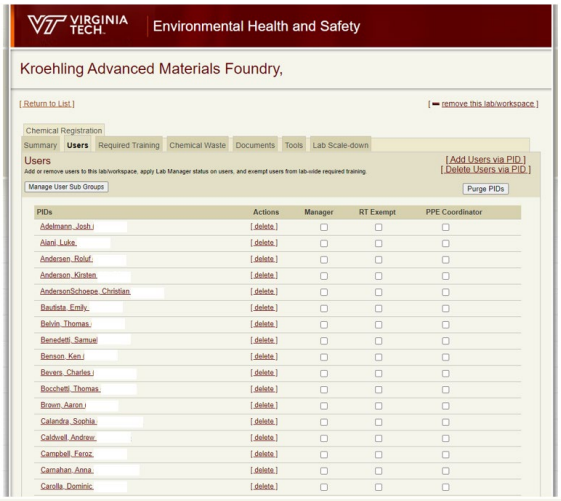

Figure 5. List of lab/workspace users. Only principal investigators or managers can edit user information.

The "Required Training" page is used to track user training. Green and red "dots" allow the principal investigators, managers, or auditors to quickly determine groups that have completed all of the required training, Figure 6. Training can be broken down into classes required for all users or classes required for specific users.

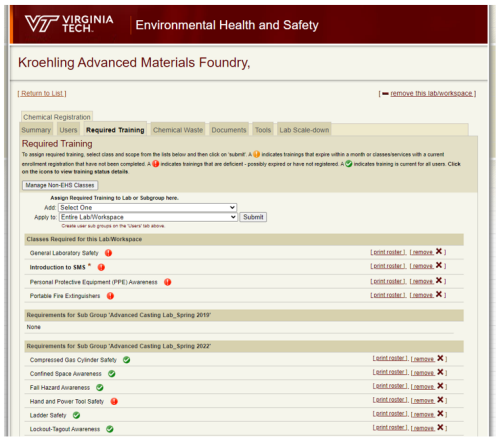

Figure 6. The Kroehling Advanced Materials Foundry "Required Training" page.

At Virginia Tech, MSE 3354: Foundry Safety is a one credit hour online class that is a co-requisite for all of the classes that take place in the Kroehling Advanced Materials Foundry.

There are fourteen training classes required for working in the foundry, Figure 7. A minimum grade of 80% is required to pass a training class.

REQUIRED TRAINING CLASSES

1. Chemical Safety – General Lab Safety
2. Personal Protective Equipment (PPE) Awareness
3. Fire and Life Safety – Portable Fire Extinguishers
4. Lockout – Tagout Authorized User
5. Silica Awareness
6. Respiratory Protection
7. Compressed Gas Cylinder Safety
8. Hand and Power Tool Safety
9. Fall Protection – Fall Hazard Awareness
10. Ladder Safety
11. Powered Industrial Truck Training
12. Crane Safety – Overhead Crane Training
13. Machine Shop Safety
14. Confined Space Awareness

Figure 7. List of required classes for working in the Kroehling Advanced Materials Foundry at Virginia Tech.

The "Chemical Waste" page is used to request waste handling supplies and to schedule pick-up of hazardous waste, Figure 8.

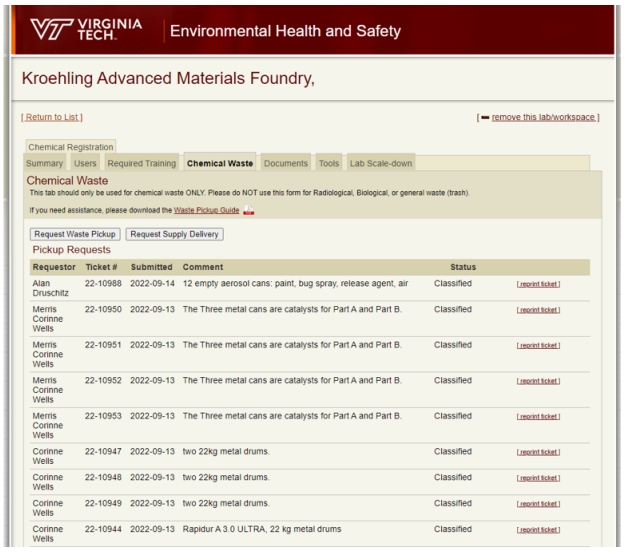

Figure 8. The "Chemical Waste" page is used for requesting waste handling supplies and to schedule the pick-up of hazardous waste.

The "Document" page contains energy control procedures, equipment manuals, hazard assessments, hazard communication documents, inspection reports, safety data sheets (SDSs), training documentation, and standard operating procedures, Figure 9. This page contains all the "right-to-know" and other important information for the lab/workspace.

For the Kroehling Advanced Materials Foundry at Virginia Tech, available documents in the "Document Repository" include:

- 92 safety data sheets;
- 5 standard operating procedures;
- 6 hazard assessments;
- 10 energy control plans; and
- Numerous specialized testing documents (i.e., respirable crystalline silica exposure when molding, lead exposure when melting copper alloys, and hexavalent chromium exposure when melting stainless steel alloys).

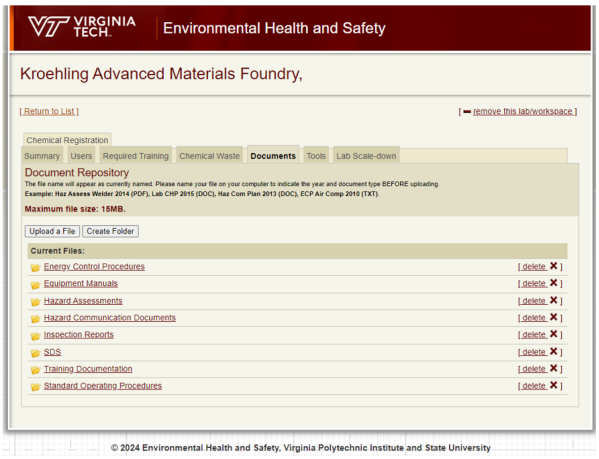

Figure 9. The "Document" page provides easy access to "right-to-know" and other important information.

The "Tools" page contains helpful information for performing assessments (i.e., Respiratory Hazard Assessment, Noise Hazard Assessment, etc.), Figure 10.

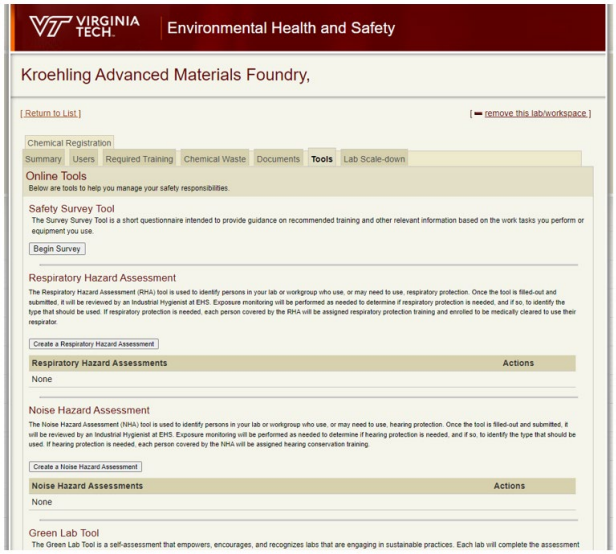

Figure 10. The "Tools" page provides helpful information for performing assessments.

The “Lab Scale-down” page provides information and a checklist for lab closures or reduced operations, Figure 11. This page was developed to assist with meeting Covid-19 requirements.

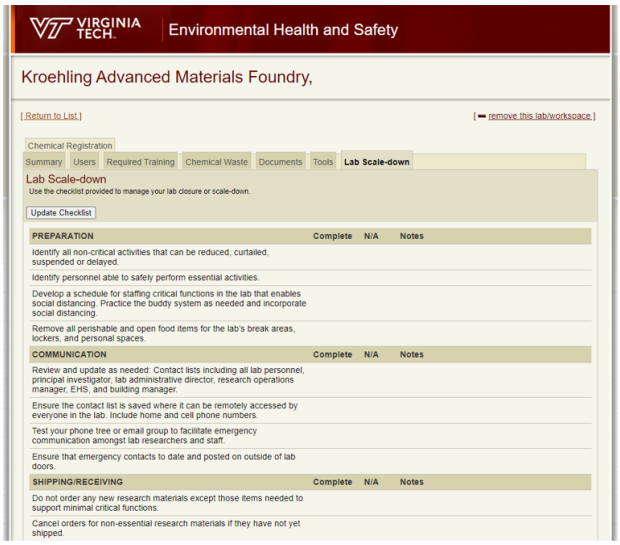

Figure 11. The “Lab Scale-down” page provides information and a checklist for lab closures or reduced operation.

Hazardous chemicals are inventoried every year, and the “Chemical Registration” pages simplify this process, Figure 12. When the user clicks on “annual chemical registration,” they are taken to a list of hazardous materials. To complete the registration process, all the user needs to do is scroll down the list of materials and fill-in the amounts of the materials that are on-hand or expected to be on-site during the year. There are 196 hazardous materials included in the chemical inventory list, Figure 13.

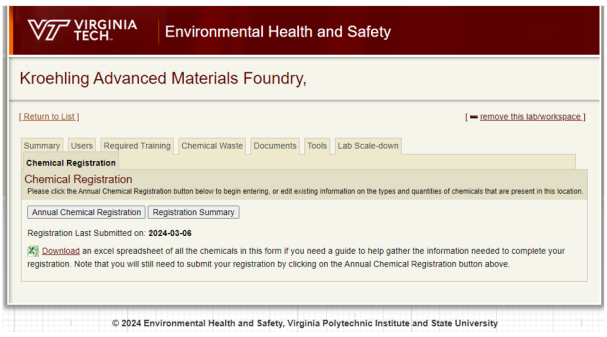

Figure 12. The “Chemical registration” page makes it easy to produce yearly inventories of hazardous materials.

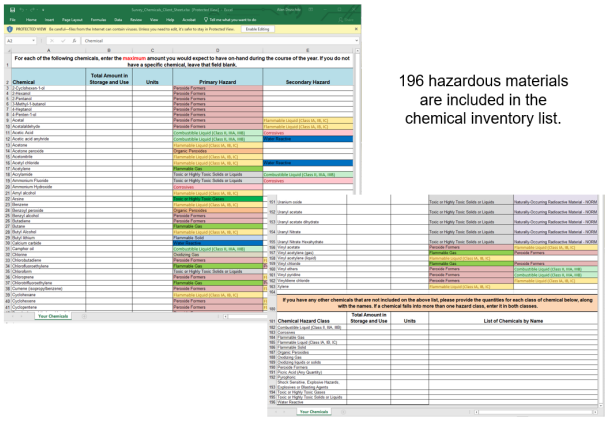

Figure 13. Examples of the hazardous materials included in the chemical inventory list.

SUMMARY

In summary, the Virginia Tech Safety Management System that was created and is maintained by the Virginia Tech Environmental Health and Safety Department is a comprehensive online system for providing faculty, staff, and students with needed/required safety information in an easy-to-access format that is available 24/7.

ACKNOWLEDGMENTS

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