



SAFETY MATTERS

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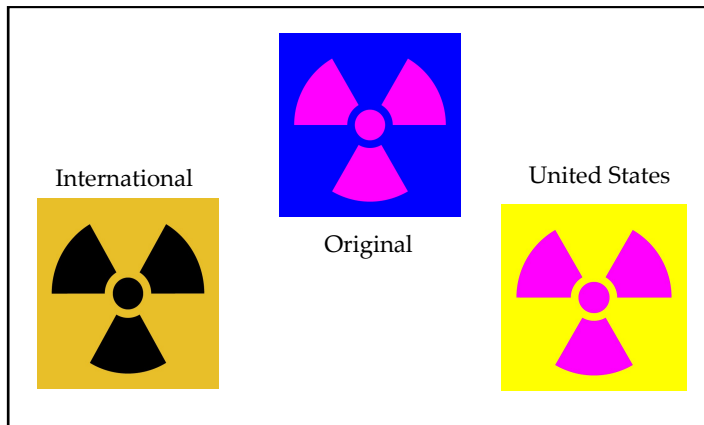
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Printed on
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The Origin of the Radiation Sign

By Guillermo Michelena, Associate Health Physicist

During the time the first artificial nuclear reactor was built, and at the time the first nuclear bombs were dropped, there was no standard symbol to warn of the risk of radiation. Many institutions working with radiation during and after WWII had developed their own signs and symbols for their own purposes, yet there was no radiation symbol accepted and used by all. The radiation hazards never encountered before the Manhattan Project eventually pushed towards a universal radiation sign.

The symbol itself on the radiation sign is known as "trefoil" - a circle in the center representing a radiation source, and three identical blades equally spaced around the circle representing radiation. It is speculated that the trefoil symbol originated from the Japanese battle flag, the Rising Sun Flag. The trefoil could have also been inspired by flags with propeller symbols seen in the harbor near UC Berkeley at the time, but this is speculation as well. The color chosen for the trefoil symbol was magenta because it is distinctive and did not interfere with any other color code already in use by the lab. Using magenta for signs also came at an excessive cost, which was believed to be a deterrent from others using it. Additionally, the original version of the radiation sign used blue as the background color since blue was the least used color in the radiation areas of the lab at the time. Thus, the original radiation sign became a magenta trefoil on a blue background. However, this color choice would not prove to last.



The radiation sign seen today is not magenta on blue, instead it is magenta on yellow or black on yellow. By the late 1940s, there was a consensus to create a standard radiation sign for all who worked with radiation, as there was still none. With that intent in mind, an information meeting held in 1949 found many institutions discussing the topic of a standard radiation symbol. Ideas were pitched back and forth among representatives of these institutions, including the sign created by UC Berkeley, but the discussion centered around the choice of color rather than the symbol itself. Despite no opposition against the trefoil symbol, there was disagreement on the use of blue as a background color because blue is a color that fades more quickly than others and it is not as distinguishable from far distances. Ultimately, no consensus was reached by the end of the information meeting. In 1949, the Health Physics Division from Argonne National Lab decided to adopt an edited version of the sign proposed by UC Berkeley. This edited version had a yellow background instead. It was already common to use yellow to visually communicate caution, and yellow would be more noticeable and distinguishable from farther distances than blue. Once Argonne National Lab adopted the edited version, they urged other institutions to do the same.

The radiation sign first adopted by Argonne National Lab is now formalized in the Code of Federal Regulations (CFR Title 10, Part 20). The current formalized radiation sign can have a magenta trefoil on a yellow background, which is more common in the United States, or it can have a black trefoil on a yellow background, which is more common internationally. Most importantly, the current radiation sign effectively warns of the risk of radiation due to its visually striking appearance, its unique and unambiguous characteristics, and the fact that the sign is accepted by groups of all backgrounds.

For more information on radiation hazard communication, please contact the EH&S Radiation Safety Program at rso-clinical@columbia.edu.

Keeping the Chemical Inventory Current - Uniquely Hazardous Chemicals

By Magdalena Andrzejewska, Safety Advisor II

When considering the need to maintain a current chemical inventory, the ChemTracker system is a natural place to start. And while ChemTracker is a crucial part of the inventory process, there is more to it than digital data. Another important aspect of maintaining a current inventory is visual inspection of the chemical containers, and in certain cases, keeping accurate records for these containers to ensure safe storage.

To promote the safety of researchers in the laboratory, any chemical container should be removed from the laboratory immediately if they show signs of:

- leaks,
- deterioration,
- damage around the lid area.

Also, caving and bulging of the containers are indicators of chemical reactions within the container and containers showing these signs should also be removed.

There are certain groups of chemicals that should be inspected regularly because of their unique properties and hazards. To introduce a few:

1. **Peroxide formers** - These include a group of compounds that tend to form unstable oxygenated compounds upon prolonged storage. To comply with FDNY Fire Code and University policy every peroxide forming chemical should have a green label attached to it. The label should indicate the date the container was received and the date it was opened. Six months after opening the contents should be tested for the presence of peroxides, and one year after opening, the container should be disposed of as hazardous waste.
2. **Picric acid** - Also known as trinitrophenol, is commonly found in research laboratories. The compound is an explosive in nature, and it is important to inspect picric acid containers on a regular basis. To remain safe, the solution needs to contain at least 10% water, which minimizes the risk of detonation. The presence of any crystallization forming around the neck or formation of yellow spiky crystals in the solution are indicators that the container must be removed from the laboratory.
3. **Hydrogen fluoride or hydrofluoric acid (HF)** is a chemical compound of extreme toxicity. It should never be handled without proper training. Exposure to very small amounts may be fatal for humans when ingested, inhaled or when it comes in contact with skin. HF should always be kept in its original container as it is incompatible with many commonly used materials. The container should be inspected regularly to ensure it is in good condition and has no signs of leaks, damage or deterioration.



Any chemical container should be removed from the laboratory immediately if they show signs of:

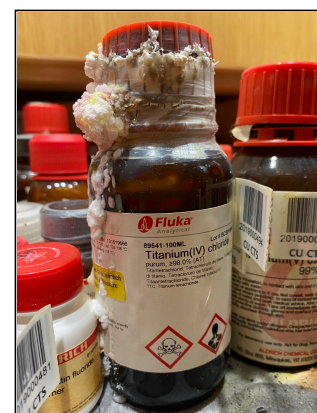
- leaks,
- deterioration,
- damage around the lid area.



Damaged Caps



Picric Acid Crystals



Titanium Chloride

These are just a few examples of chemical compounds with unique hazards that are present in laboratories across Columbia University's campuses. Laboratories should always be mindful of the safety of their researchers and staff, and regularly making sure that chemical containers are in good condition minimizes the possibility of personal exposure.

Congratulations to

**Kathleen Crowley
for her promotion to
Vice President for
Environmental Health
and Safety (EH&S).**

EH&S Research Safety and Biosafety Q&A Sessions

EH&S is now offering
optional open forum
question and answer
sessions to supplement the
on-line training programs.

**Attendees will be entered
into a raffle for a lunch
voucher to the
Faculty Club, Faculty
House or LDEO Cafe!!**

Contact
safetytraining@columbia.edu
for more details.

EH&S Digital Signage

Use the QR code on EH&S
digital signage at
Columbia University
campuses to enter a raffle for
a lunch voucher to the
Faculty Club, Faculty House
or LDEO Cafe!!

**One winner chosen
monthly ...
you could be next!**

**Check your RASCAL
training transcript to
ensure you are compliant
with all safety training.**

**Don't let your C-14 card
expire, renew 60 days prior
to the expiration date.**

The Times They Are A-Changin'

By Pam Shively, EH&S Training Coordinator

Safety education is a foundational element of a successful safety program. For safety education to succeed it must be clear, accurate, high quality, and flexible. Over the years, Columbia's research community has increasingly asked for flexibility in scheduling and delivery modality of safety education. Environmental Health and Safety (EH&S) also previously self-identified the need for enhancement to safety education for specialty groups within the University. EH&S has been working to accommodate these requests with on-line training in RASCAL, and the COVID-19 pandemic has further catalyzed these efforts to bring clear, accurate, higher quality, and flexible safety education to the research community and beyond. As a result, safety education at Columbia has evolved from being delivered on a fixed, monthly schedule to a fully (or nearly) flexible program that affords researchers 24/7 access to training content. While RASCAL remains the primary training platform, EH&S has integrated newer technology that provides an improved experience for trainees.



EH&S is proud to now offer RASCAL safety training with voiceover and closed captioning, which participants have been responded to with overwhelmingly positive feedback. Currently, 55% of EH&S' training on RASCAL includes these features. RASCAL allows Columbia researchers to complete the training on their own time, never having to worry about missing a class or appointment to attend training. Individuals can move through the training at their own pace as well. As different presenters often highlight something that is significant to them, hosting the training on RASCAL allows the message in the training to remain consistent. As a supplement to the courses, EH&S provides a monthly Q&A for Biological Safety and Research safety for any questions. Check out one of the Q&A sessions, one lucky person will win a free lunch to the Faculty Club or Faculty House! Together, these features address the need for clarity, accuracy, and flexibility.

Certificate of Fitness (C-14): TC5451 training is one of the voiceover and closed caption-training presentations on RASCAL. Any researcher interested in obtaining a C-14 permit through Columbia University must complete TC5451 on RASCAL and must also be compliant in Laboratory Safety Training (either TC0950: Laboratory Safety Refresher or TC4951: Initial Laboratory Safety Training). Depending on experience and qualification, some applicants will be required to go to Brooklyn to take the C-14 test; regardless, EH&S will send your application to the FDNY on your behalf. EH&S believes that assisting more researchers to obtain a C-14 permit will help promote a stronger safety culture across the University. Please review the information on the EH&S website find out more regarding obtaining a C-14.

EH&S has also created training videos for Facilities and Public Safety, with whom the Department collaborates on many laboratory-based initiatives and services. Additionally, EH&S has created safety training targeted to the many groups of high school and undergraduate students who visit and/or participate in research laboratory-based learning across Columbia's campuses. These videos capture attendance using a QR code. Having a video for training new hires ensures that Facilities and Public Safety personnel have training prior to entering labs, instead of waiting for a training date for all new hires to attend. Students participating in research programs can view the videos prior to arriving at Columbia University so they can start in the laboratory on day one. As a reminder, please contact EH&S if your laboratory will be hosting visiting students to ensure they are directed to the proper training.

EH&S' training content is ever evolving and improving. In the future, the current refresher modules for Laboratory Safety and Biological Safety

(continued on page 4)

Meet the EH&S Staff



Lauren Kelly
Senior Project Manager-Safety and
Regulatory Affairs

Lauren Kelly is full of energy, as everyone who knows her will tell you. Whether riding her bike, running, taking a walk in the woods, or responding to a hazardous incident on campus, she is a force of nature. Her dynamic

personality gives her the ability to connect with colleagues, family, neighbors, and strangers alike. Her current part-time position is the Senior Project Manager-Safety & Regulatory Affairs, a role she has occupied for the past five years. Her EH&S roots go deeper, however, as she has been a part of the Hazardous Materials program for over eight years. Lauren grew up in the Slate Belt of Pennsylvania in Bangor, 75 miles west of NYC, in an area known for open pit slate mining. Her first job at ACE Bangor Hardware taught her the values of customer service, responsibility, and good business practices.

Her animal soulmate is the horse, ready to go long distances, a source of fun and one who can eat quite a bit (her words). While most people have a favorite team because of the sport or a player, Lauren follows the Chicago Cubs because she loves the mascot! She loves to entertain and cook, filling the house with aromas of soups and cookies, and putting on quite the table setting for holidays. To wind down after a long day at EH&S, she enjoys going to the beach to listen to the ocean with her husband and relaxes doing beach yoga. Although she is motivated when she sees her friends take up hobbies, especially ones which she has introduced to them, her eyes are never as bright as when she is working with hazardous materials or taking HAZWOPER training.

Lauren enjoys coming to work every day to help labs solve issues with hazardous waste and help her EH&S teammates grow in their knowledge of hazardous materials. Her favorite professional advice is from Liza Krass, Director of Radioactive Service at Veolia, "If you are going to use or apply regulatory knowledge, you better know where to find it and be accurate enough to cite it appropriately." Being able to exercise without fear for her life draws Lauren to dream of living in Moab, UT, where she would be able to mountain bike, run trails, hike, raft, eat mole sauce and enjoy the beautiful belts of natural uranium all in one location. Yes, she loves living life to the fullest, and her favorite quote by Steve Prefontaine is perfect for her, "To give anything less than your best is to sacrifice the gift." No one will ever criticize Lauren for giving less than her best every day!

Peter Caracappa
Chief Radiation Safety Officer



Dr. Peter Caracappa has been with Environmental Health and Safety at Columbia for almost five years, joining the team in May of 2018. He is the University's Chief Radiation Safety Officer, and the radiation team has expanded to provide service to various locations throughout the city under his direction.

Growing up in West Chester, Pennsylvania, Peter became a Philadelphia Phillies fan at a youthful age. Although Peter enjoys other sports, baseball has always been his favorite. One of his favorite Phillies memories is attending a game during the 2008 World Series. He is hopeful he will be able to attend the World Series in 2022 as well! For those a bit older, you might remember that Commodore computers headquarters was in West Chester, more recently identified as being the headquarters and studios of QVC. Peter's curiosity suits him well, as he is always learning new things. He recognizes Nobel Prize winning physicist Richard Feynman as supplying his inspiration in the book, "The Pleasure of Finding Things Out." His suggestion to use QR codes to take attendance at training sessions has been beneficial to the EH&S training department. He is always willing to help the team learn new skills, like how to create a QR code that links to a Google Doc. Peter began his career scooping ice cream and stocking shelves at a local dairy farm in West Chester, "The Milk Store." From these humble beginnings, he now leads a fantastic team of radiation safety professionals. He enjoys his work because he does something different every day. He also enjoys talking baseball with other fans in the office.

Peter identifies with a capybara, known for being gentle, genial, and relaxed in nature. This comparison is a perfect match, as he would like to see people develop a stronger sense of kindness toward one another. To relax when not working, he enjoys the perks of being a resident of New York City, either spending a quiet dinner with his wife, attending the theatre, or performing in the theatre.

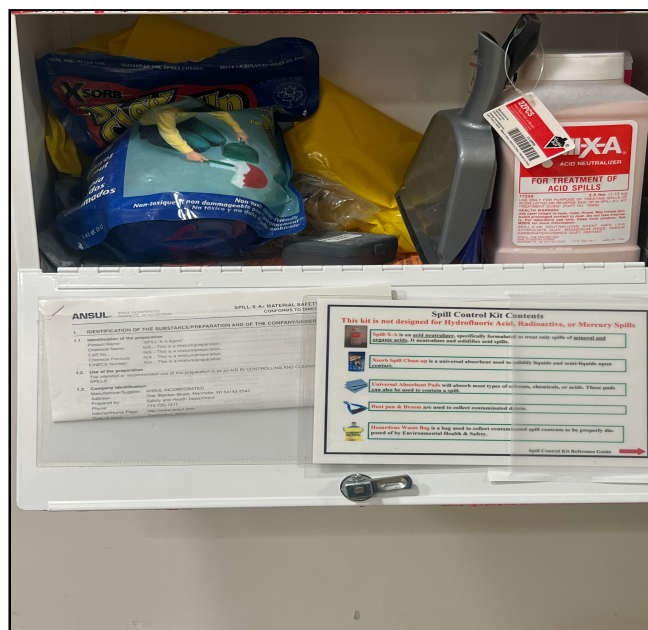
(continued from page 3) will be updated with shorter versions. New presentations - including a module targeted specifically to Principal Investigators on establishing a strong culture of safety in the laboratory - are soon to be added to RASCAL, and each will be announced by email upon release.

Also in the works area module to assist with keeping a current Laboratory Assessment Tool and Chemical Hygiene Plan, or LATCH and an Anesthetic Gas training for those with animal research protocols involving surgical procedures. Please contact safetytraining@columbia.edu with any other ideas for new EH&S training programs.

Spill Control Kits for Manageable Laboratory Spills

By Sebastian Flynn-Roach

Manageable spills are spills that do not spread rapidly, do not seriously endanger people or the environment, and which can be handled safely by laboratory personnel familiar with the hazardous properties of the chemical(s) involved without the assistance of EH&S personnel. When manageable spills involving hazardous chemicals occur, it is imperative for laboratories to be equipped with the proper clean-up materials necessary to contain, control, and safely collect the material(s). EH&S strongly recommends purchasing and assembling a spill control kit specific to the type of hazardous chemicals present in the laboratory. At a minimum, EH&S recommends that chemical spill kits should include neutralizing or absorbent material, universal absorbent pads, sealable waste disposal bags, Chemical/Hazardous waste labels, and Personal Protective Equipment (eyewear, disposable nitrile gloves, protective shoe covers).



At the Morningside and Manhattanville campuses, EH&S has supplied spill control kits available for use during minor/incidental spills. Morningside spill control kits are mounted in corridor locations on all laboratory floors within campus buildings. Spill control kits in the Jerome L. Greene Science Center at Manhattanville are in each quad within the fume hood alcove stations. If any items are removed, please contact EH&S by emailing labsafety@columbia.edu to request additional supplies to replenish the kit's contents.

Some examples of hazardous chemicals that a spill kit can clean-up are:

- Organic Solvents
- Acids and Bases
- Oils

It is critical that kits contain the appropriate neutralizing/absorbent media based on the type of hazardous materials present in the laboratory. Chemicals such as hydrofluoric acid, mercury, and any radioactive materials have specific clean-up procedures that must be followed to contain and collect spills safely. Contact EH&S if spills in either of these categories occur in the laboratory. For any spills that are unmanageable either due to the quantity or more severe hazard characteristics of the spilled material, call EH&S immediately during business hours or contact Public Safety if after-hours. For additional guidance on manageable spill clean-up procedures, please visit the EH&S webpage: <https://research.columbia.edu/chemical-spills-and-explosions>.

96%

Physics Students 2022
Compliance on
Laboratory Safety and
Laser Safety

EH&S Fun Fact

CUIMC EH&S and MS
Environmental Health and
Radiation Safety (EH&RS)
became one team in 2005;
EH&S and CUIMC Radiation
Safety integrated in 2010.

EH&S Anniversaries

Carmen Hoepelman - 25 Years
Jillian Sacheli - 15 Years
Angela Meng - 10 Years

Important Updates on Biosafety Cabinet Services

By Samira Joussef Pina, Biological Safety Officer

At Columbia University, individual laboratories and departments are responsible for the annual certification of their biosafety cabinets. EH&S and Procurement Services recently revisited and updated Columbia's University-Wide Purchasing Agreements (UwPA) for vendors offering biological safety cabinet recertification and decontamination services. Under the new Agreements, the University's preferred vendors are Technical Safety Services (TSS), Scientific Equipment Product Service (S.E.P.S.) and DigeLab Solutions. The renegotiated contracts have revised pricing and offer cost savings to Departments and PIs. These suppliers have also agreed to a high standard of customer service related to convenient scheduling of visits, notification of expiring certifications and sharing of technical knowledge and best practices with investigators. The certification price is typically \$125-150 if no other services are required. The companies' contacts and more information are available on the EH&S website.



BSCs typically have a lifespan of over 20 years, and one of the most common brands found in Columbia laboratories is Baker. Earlier this year in June 2022, Baker announced ending support for a large range of older BSC models as parts have become increasingly scarce. Some of their suppliers no longer provide components required to service these older models. As a result, Baker can no longer provide support to the following BSCs:

•NCB6	•SC-4TX	•VBM	•DS400	•B40A
•NCB-B	•SC-6TX	•B315	•4TX	•B60A
•NCB-C	•SG250	•B4000	•6TX	•B40-112
•CVF	•SG400	•B6000	•BC-4	•B60-112
•UVF	•SG600	•B40	•BC-6	•B40A-112
		•B60	•NCB4	•B60A-112

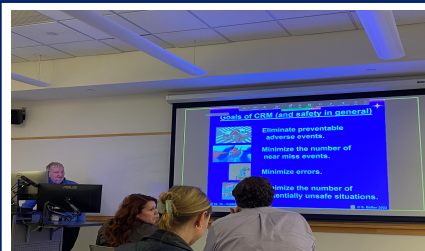
Laboratories that own one of these unsupported BSCs must be aware that it will no longer be possible to have it repaired in the event of a mechanical breakdown, and an upgrade should be considered. For more information regarding Baker services, please contact their Technical Support at (800) 992-2537, ext. 498.

Biosafety Team Reconized by ABSA International

In mid-October, the EH&S Biosafety team attended the annual ABSA International Biosafety and Biosecurity Conference in Milwaukee, WI. At the Honor Awards and Special Recognition Luncheon, Columbia was one of three institutions recognized by ABSA International for their promotion of Biosafety and Biosecurity month, which occurs each October. Their award was for the use of digital lobby signage to draw attention to a change in IBC submission procedures. This October, digital lobby signage was posted to address biological materials stewardship and asked researchers to comply with a CDC request to review frozen specimen archives for the presence of material that may contain poliovirus.



Pictured: Biosafety team members Chris Aston, Cody Cameron and Samira Joussef-Pina along with Training Coordinator, Pam Shively, who administers the digital lobby screen initiative for Columbia EH&S.



EH&S Fall Full Staff Meeting with Guest Speaker Dr. Stephen Balter

Twice a year, EH&S staff have the opportunity to present a topic to their colleagues at the Department's Semi-Annual Full Staff Meeting. On October 18, 2022, EH&S met on the CUIMC campus, with special guest Speaker Dr. Stephen Balter. Dr. Balter spoke on Crew Resource Management, stressing how communication is important for a crew to be successful. The EH&S team members who presented were: Dennis Farrell, Emily Riber, Guillermo Michelena, Daniela D'Armetta, Sarah Aloe, Olivia Salamy, Magda Andrzejewska and Lauren Kelly. Presenters typically choose topics that illuminate the great work they have been involved in, and each did an excellent job sharing interesting information and experiences. Thank you to the presenters, we can't wait to see what's next!

Editorial Staff: Kathleen Crowley, Chris Pitoscia, Pam Shively, Sonia Torres
Please share questions or comments with us at newsfeedback@columbia.edu