PUBLISHED BY SAFETY PARTNERS

Hands-on Workplace Safety

Incidents, Accidents, and Near Misses in Laboratory Research

VOLUME 9

SAFETYPARTNERSINC.COM

Incidents, Accidents, and Near Misses in Laboratory Research

2024 - VOLUME 9

PUBLISHED BY
SAFETY PARTNERS
Hands-on Workplace Safety

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A SPECIAL THANKS TO OUR CLIENTS AND THE ENTIRE SAFETY PARTNERS' FAMILY

Manufactured in the United States. Published by:
Safety Partners, LLC., 19A Crosby Drive, Suite 300, Bedford, MA 01730.
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SAFETY PARTNERS
Hands-on Workplace Safety

OUR MISSION

Safety Partners creates and implements EHS programs and related services for science and technology companies working with hazardous materials, equipment, and processes.
We deliver deep technical EHS expertise with a team approach. From lab design through product development, our clients trust us to keep their employees safe, facilities compliant, and operations running smoothly, allowing them time for better science and successful products.

OUR VISION

We will continue to be an essential ingredient in a nation-wide movement to promote and enact a culture of employee health and safety in organizations engaged in science and technology, from concept to product. We are committed to keeping scientists and engineers safe, their labs compliant, and their operations running smoothly so their work is singularly focused on the next scientific breakthrough!

OUR VALUES

Respectfulness: We are all unique and we all add value.

Curiosity: Growing our professional selves; we embrace an attitude of life-long learning. We are honored to be among the life science and EHS communities of forward thinkers.

Ingenuity: We approach every client engagement with fresh eyes, taking time to learn company-specific details — no program we provide is identical to another.

Connectivity: Surrounding ourselves with excellent people from all sorts of disciplines. Nothing happens without caring about the success of those around you. If others aren't succeeding, you can be sure you won't either.

Constructive Honesty: Mentoring and supporting our colleagues and clients; knowing it is ok to suffer setbacks, provided you learn from them.

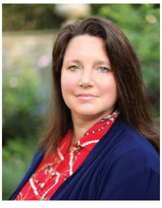
Dear Partners,

I am proud to introduce you to this year's ninth edition of our yearly publication, *Incidents, Accidents, and Near Misses in Laboratory Research*. Over the past year, we have captured real-life experiences from members of our community, and today we share with you their insights, experiences, and lessons learned in the realm of safety and risk management in laboratory settings.

The journey in the lab is often marked by unexpected challenges that require your knowledge and ability to respond to emergencies promptly. At Safety Partners, we believe that sharing these stories is essential to fostering a culture of safety and continuous improvement and growth. Within these pages, you will find incidents that have occurred in the lab and stories shared by the individuals who experienced them, but these stories are not just about the events but also the lessons learned, and the actions taken to enhance safety protocols.

Thank you for your continued support. Together, through sharing these stories we will continue to shape the future of a safe environment in lab settings.

Best regards,



Jennifer Reilly
President & COO

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INTRODUCTION

When you think of safety training, what comes to mind? Maybe you're thinking of spending hours going through dull modules full of far-fetched scenarios. Or perhaps you're dreading going through drills and can't imagine how they could possibly be relevant to your workplace. After all, everyone naturally wants to avoid danger—so shouldn't the safest choices be the most obvious?

In reality, the correct course of action in the event of a safety incident is often unclear. Furthermore, it takes sufficient training to understand the different variables that should be considered when assessing workplace hazards.

In this edition of Incidents, Accidents, and Near Misses in Laboratory Research (IANM), you will find several stories from laboratory workers with real-life examples of safety incidents, procedural deviations, and improper facility management. By understanding the gaps that led to these issues and how they were resolved, you can gain insight into effective strategies that may help improve safety policies for your own teams.

AN ILL-FATED SHORTCUT

When I was the lab manager for a major pharmaceutical company, my responsibilities were to oversee five different labs ranging from good manufacturing practice (GMP) to research and development (R&D). I also had to oversee the facilities side of things and help maintain the equipment for our facility. Our GMP area was a cleanroom, so we had completely separate Heating, Ventilation, and Air Conditioning (HVAC) requirements for that location versus all of the other lab spaces.

Since we had to do our own heating, ventilation, and air conditioning (HVAC) maintenance for the GMP lab, we eventually hired a technician, Daniel, to handle maintenance so we wouldn't have to wait on a service vendor. Daniel was trained on the required procedures for each step of the HVAC maintenance: getting on the roof, opening the HVAC unit, changing the HEPA filters, and so on.

One day it was time for the regular preventative maintenance of an HVAC unit on the roof of the cleanroom. Daniel started off the process doing all the right things, including notifying people that he would be on the roof to access the HVAC. Once inside the system, he was supposed to shut down the fan filter units for the specific area that he was servicing. However, despite his training on the proper procedure, he tried to take a shortcut to save some time.

Instead of shutting down the fan filter units, Daniel figured it would be simpler and much faster to just pull a filter out and put a new filter in. The only problem was that it wasn't that simple at all. The cleanroom units are turning the air over like crazy; the air is flowing through multiple HEPA filters, multiple times an hour. If the unit isn't shut down, the air flow creates a suction or vacuum of sorts.

Unfortunately, Daniel figured that out the hard way. Without shutting the unit down, he pulled the old filter out. That went fine, but as he went to put in the new filter, his gloves got pulled off his hand by the suction inside the unit, and he lacerated his hand pretty severely.

Daniel immediately called for help on the radio, yelling that he'd been injured and hurt his hand badly.

Immediately after responding to his requests for help, we started an incident report to document what had happened. Daniel didn't shy away from the truth and shared everything; he admitted he should have done things the right way, but thought he could skip steps to save some time. Maybe he wanted to rush because he felt like he needed to get to other things. However, regardless of all the tasks on someone's plate, we needed to enforce proper procedures to make sure everyone stays safe.

For treatment, we referred Daniel to the occupational health center we were partnered with where he got stitches in his hand. After getting the stitches out, he had to follow up with a round of antibiotics to prevent any further issues.

The aftermath of the incident had broader implications as well. We had to do a full cleaning of the affected HVAC unit to make sure there were no contamination issues in the cleanroom. Even though the unit services only a section of the cleanroom, we had to shut down the whole area. So by trying to save a couple of hours during maintenance, Daniel ended up causing a shutdown period that lasted a couple of days.

As an after-action report follow-up, we also instituted what's called a 5 Whys analysis. This technique involves asking a series of questions intended to pinpoint the exact reason an event occurred. One major question was whether this incident was caused by a lack of training. After some back and forth, we acknowledged that yes, it was the fault of the employee. Daniel was trained, and he knew better. When we interviewed him, he did say that he knew he was in the wrong. We concluded that maybe just doing one training session a year isn't enough, especially when it comes to something that is a bit more involved—the training should be reinforced.

Daniel stayed on with us, but we did provide refresher training and reviewed what had happened. Although his overall performance could be part of a different discussion, we valued his safety regardless.

We took steps to reinforce his training to make sure that this type of incident doesn't happen again to him or anybody else. We also wanted to drive home that—regardless of what his tasks are or how many things are on his to-do list—we want him to take the time to do things right, even if it means he doesn't get to everything. We'd rather people take the time to do something properly than putting themselves at risk or causing other issues.

Fortunately, our work culture already emphasized safety. At the start of each meeting, we would spend a few minutes talking about safety issues. The topic could be slips and falls, electrical issues—things that are relevant to everyone. It helped to keep safety at the forefront of everyone's mind.

Although the incident with Daniel was unfortunate, it served as a useful reminder that even when people are properly trained, things can still happen. It was surprising to us because he was so experienced and had done this several times before without an issue. It was an eye-opening realization that people can become complacent and start skipping steps if they feel the need to rush. As the lab manager, I had to reevaluate the training process and how to reinforce things to avoid further mishaps. And for Daniel, he learned the hard way that taking shortcuts isn't worth it. Safety procedures are put in place for a reason, and if they're not followed, there can be serious consequences.

RADIATION WORRIES

Years ago, when I was doing academic research at a large hospital, our lab was studying an enzyme that contains the metal selenium. One of the things we did was trace the enzyme to look at how long it stayed in the cell and measure how high the levels were. The best way to do this was to label the enzyme with a radioactive isotope called selenium-75. When we worked with it, we had to take steps to protect ourselves from the radioactivity; it wasn't immediately dangerous, but it could lead to long-term health problems down the line.

There was a designated area for us to work with the radioactive probes; it was in a contained area in a corner, away from the main lab space. To prevent radiation exposure, we had to shield the work area using lead bricks. There was also flexible lead foil that we would use to cover other work areas that could be exposed and a plexiglass splash shield to protect whoever was working. Some of us also wore dosimetry badges, which can detect and measure radiation exposure.

Among those of us in the lab, Avery did the most work with radiation. Her office was on the other side of the wall next to the workspace; she would work in the office when she didn't need to be in the lab. However, another student in the lab, Nia, was pregnant. Understandably, Nia was concerned about possible exposure to radioactivity, and the rest of us were cautious as well.

Although she was always seated away from the radioactive workspace, Nia took extra safety precautions into her own hands. She would carry around a small survey meter—a probe—that could detect radiation; the meter would give off an audible signal when radiation levels were high, but wouldn't react at all if radiation couldn't be detected. Since Nia didn't work around radiation, the probe wouldn't go off when she was in the lab. As far as anyone could tell, everything seemed fine.

At some point, Nia—carrying her survey meter, as usual—went over to Avery's office. To her surprise, the meter's signal started going off, meaning there was radioactivity in the office. With all the steps we'd taken to shield the lab when working with radioactivity, it had never occurred to us that the wall behind the workspace wouldn't completely block the radiation.

> *Our lab as a whole was properly trained on how to work with radiation. We all knew the procedures to protect the space from contamination and to check afterward to make sure the area was clean.*

Fortunately, Avery's office was a good distance away from where Nia worked. Adequate distance, along with proper shielding, helps to protect against radiation exposure, so there wasn't any major concern regarding Nia's pregnancy. However, it was still a potential safety issue for anyone who might go into the office, especially Avery since she sat there every day. While she did wear a badge to detect radiation, it was on her lab coat. She would take her lab coat off before going into her office, so there would be no way for her to know if she was exposed to radioactivity while there.

Once the situation was discovered, we took steps to make sure everyone was protected. We used lead foil and bricks in front of the wall to block the radiation from going through to the office on the other side. We checked radioactivity levels in the office and made sure that nothing was coming through. There was no indication that Avery or anyone else had high exposure to radiation; therefore, no interventions were determined to be needed at the time.

This experience happened many years ago and taught us that knowing how to work with radiation doesn't mean you know everything about radiation. Our lab was trained in safety procedures, but none of us realized that gamma radiation emitted by selenium-75 was strong enough to go through a concrete wall. We learned that it's crucial to really understand the type of research being done, and the materials being handled, to evaluate potential safety risks before an incident happens.

Over the years, more has been done to address safety issues. There are now systems in place to help set up research labs in a way that addresses potential safety hazards. With more trained personnel to provide oversight, researchers are more aware of the potential risks in their labs and can prevent dangerous exposures.

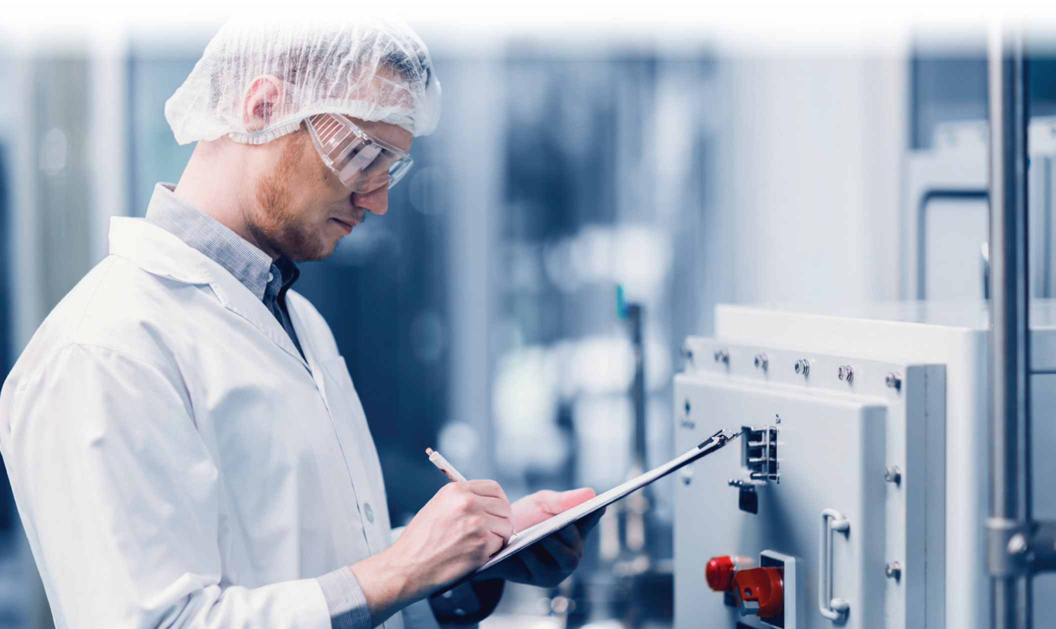
A SUMMER TO REMEMBER

I was working as the technical manager for a nanotechnology core facility at a large university. We had lots of summer interns, mostly undergraduate students, who came from all over the country. At the beginning of the summer, we provided each intern with the required training for the areas of the facility they were going to work in. Each student was going to work in different labs and use different instruments, so the training was tailored accordingly. Once trained, they were cleared to access specific labs using their ID and were not allowed to let in anyone who hadn't been trained.

One afternoon, I was training a couple of interns on how to use one of the instruments in the lab. Suddenly, one of my employees, Will, came running up to me in the middle of the training. He was in a real panic and informed me that someone was lying on the floor in one of the rooms in the facility, and there was blood! I stopped the training immediately and told him to call 911 before heading over to check the situation.

I got to the room and, because it was an emergency, didn't go in wearing full PPE. There was an intern named Nell lying on the floor, in full PPE, her head covered in blood. After checking and finding her pulse, I saw that she was unconscious and had a large gash on her head. Also in the room was another intern, Adam, who was just standing there, not really knowing what to do.

While waiting for the EMTs to arrive, I asked Adam what happened. He said that Nell had been with him in the room and mentioned she'd forgotten to take her medication that morning. She then complained of feeling



dizzy and lightheaded, after which she fell to the floor unconscious. On her way down she hit her head, which broke the cap off a pull station on the wall.

The pull station was for a smoke-activated carbon dioxide release system. In the event of a fire, the system would engage and release a large amount of carbon dioxide to put out the fire. Taking the cap off the pull station should also activate the system. However, even though the cap had broken off, it hadn't triggered a release.

After another five minutes, the emergency responders arrived, and Nell was starting to regain consciousness. They came in and checked her over, then transported her in an ambulance to get medical care. In the end, she had a mild concussion, but otherwise was fine.

The first thing we discovered was Nell was not supposed to be in that room in the first place. She was not trained to be there and should not have had access. It turns out that Adam—who did have access—was friends with Nell and let her in so they could chat. Unfortunately, she hadn't taken her medicine that morning, which led to her having a medical emergency in the lab. After she fell, Adam wasn't sure what to do and panicked. He told Will, who instead of calling 911 right away, came to me first.

Another thing we noted is that when Nell broke the cap off the pull station, the carbon dioxide release wasn't triggered. If this had happened as expected, hundreds of liters of carbon dioxide would have filled the room, likely causing Nell to suffocate as she lay on the floor unconscious. The failure of the system to activate was hugely fortunate in this particular scenario, as it could have led to a much more serious, potentially tragic outcome. However, the malfunction was still a significant safety concern; in the event of an actual fire, the system may not have engaged effectively.

After the dust settled, there had to be consequences for causing such a serious safety incident. Both Adam and Nell were suspended from the internship program and had to be sent home for the remainder of the summer.

One take-home lesson from this incident is that it's crucial for lab staff to know how to respond in an emergency situation. Neither the intern nor Will, an employee, responded in accordance with the procedures reviewed in safety training. Additionally, Adam let unauthorized personnel into a restricted area. Periodic reinforcement of laboratory policies, as well as emergency response training, should be required for all personnel, especially at a large nanotechnology core facility.

The incident also highlighted the importance of ensuring that emergency response equipment works effectively. The failure of the carbon dioxide release system to activate—while it was a positive in this case—was a serious safety concern. To address this, we initiated quarterly checks to ensure the system functioned as it should. This was to confirm that, in the event of a workplace fire, it would engage properly to prevent injury to the staff and damage to the facility.

Highlighting potentially dangerous scenarios through drills, mock exercises, and annual refresher training is crucial to ensure that people keep safety at the forefront of their minds. Going through safety training isn't just about checking off boxes; you're learning skills that can potentially save someone's life.

After the incident, we started an investigation and came to understand that this happened following a series of events.

ONE HOT SATURDAY

The reaction happened in an instant and the container caught on fire.

At my previous job at a startup, I came in on a Saturday morning to set up a reaction in the fume hood in our lab. The reaction—which combined ethanol, palladium on carbon, and our in-house synthesized chemical—would generate a high level of pressure. I set up the reaction inside a specific container designed to contain the pressure, which had a gauge to measure it. It was a large-scale reaction that used several grams of each component.

Before combining everything, I opened a brand new batch of palladium on carbon. I added some of it to the ethanol in the container—and it was like a bomb went off!

Inside the fume hood, there was also tubing connected to a gas line. The tubing was clamped shut, and there was a piece of cotton wedged underneath the clamp. After the reaction went off, the cotton caught fire too.

As fast as I could, I got the lid back onto the container—this would cut off the oxygen from the fire. The fire soon started to die down, and once everything had settled, I cleaned up the fume hood. I was protected by the glass sash, so thankfully, I wasn't harmed. There was also no damage to the fume hood or the equipment. Since it was Saturday, there was no one else in the lab, so I reported the incident to my supervisor first thing on Monday morning.

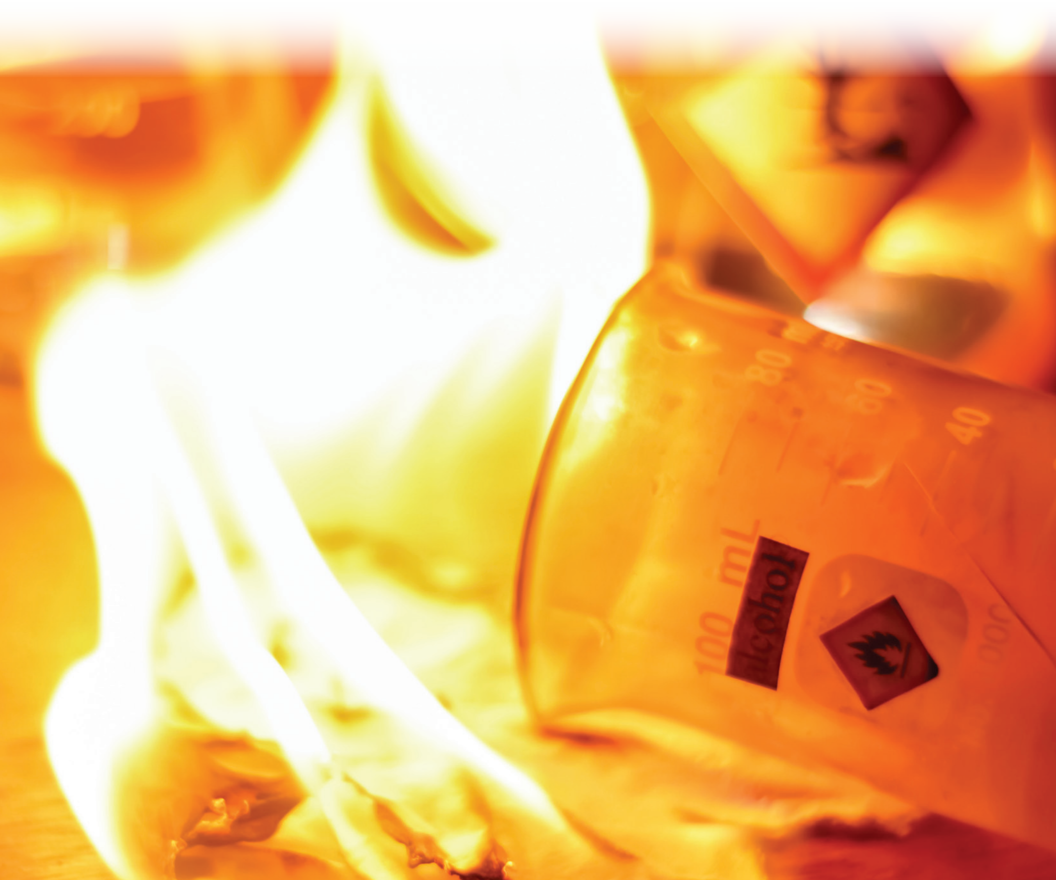
Aside from dealing with the sudden shock, I can't say I was terribly surprised. After nearly a decade of working with chemicals, I expected that a reaction could blow up like that eventually. I had set up this same reaction many times before and usually gave people a warning about the risk due to the pressure it creates. I hadn't had a problem in the past, but there can be lot-to-lot differences with chemicals. It could be that the composition of the new batch of palladium on carbon was slightly different, causing it to be much more highly reactive.

One thing that helped a lot in this scenario is that aside from the reagents I was using for the reaction, the fume hood was clean. I've always been bothered by working in a dirty or cluttered fume hood, so out of habit I always keep it clean. Some other people, on the other hand, may routinely leave out solvents in the fume hood. Solvents like ethanol are highly flammable; if the fume hood wasn't cleared out when the reaction went off, the fire could have been much more intense than it was.

The other thing that helped resolve the situation was my experience. By that point, I'd worked many years as a chemist and had established knowledge of the chemicals I was working with, including how they react together and the possible risks. That baseline knowledge allowed me to react quickly and take the correct steps to quench the fire. The company provided general safety training for emergency situations, but someone without an extensive chemistry background probably wouldn't have known how to handle that particular situation.

My quick reaction to this incident highlighted the importance of really understanding the reagents you use in the lab and their risks. What ended up being a minor incident could have been a major one without the scientific training. Additionally, my habit of keeping the fume hood clean kept the fire from spreading. Keeping your workspace clean may not seem like a big deal, but it is one of the easiest things you can do to mitigate risks in the lab.

This incident also highlights the importance of not working alone in the lab on a weekend, particularly when conducting large scale reactions involving hazardous chemicals. The outcome would likely have been much worse if this incident had involved a less experienced scientist working alone.



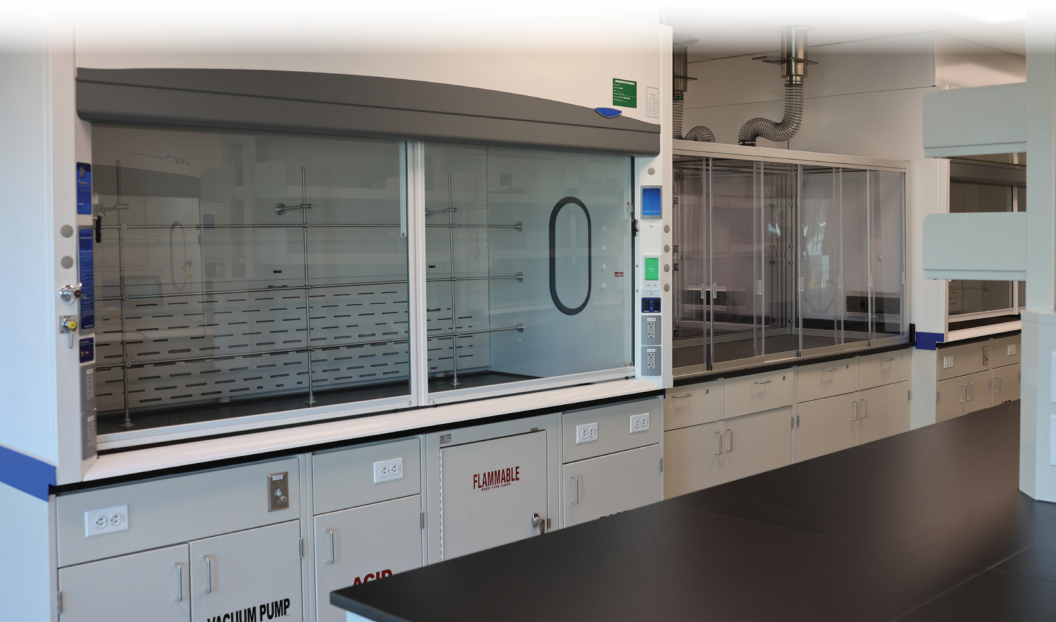
EXHAUSTING CLEANUPS

I was a manager for a company that helped oversee several different lab facilities and maintain their ventilation systems. There are two different ventilation systems used to maintain lab spaces: dilution ventilation and local exhaust ventilation. Dilution ventilation includes your standard HVAC unit, which cycles air throughout a room. Local exhaust ventilation—which is used for devices like fume hoods—captures emissions at the source and sends them through a filter to remove contaminants from the air.

Three of my past clients have had similar safety issues related to ventilation and airborne contaminants.

The first client was an industrial facility that created large amounts of dust and particulate matter in their lab. However, they primarily relied on dilution ventilation, meaning the particles were being cycled around in the air rather than being captured and filtered out. This caused the particles to get distributed across walls and floors of the lab and possibly created a breathing hazard.

When the company was leaving their facility, the property manager noticed that the space looked very dirty. While the particulates weren't immediately hazardous, from a cleanliness perspective, the condition of the space didn't meet acceptable standards. The property manager had to spend significant time and money to get the lab space and duct work sufficiently cleaned to be usable again. This could have been prevented if the company, instead of relying on dilution ventilation, had properly used local exhaust ventilation to filter out the airborne contaminants.



The second client was a lab facility that used small amounts of acids and volatile chemicals. However, instead of installing fume hoods to work with the chemicals, they just used them on the open bench. Like the first client, this meant that vapor from the chemicals was being dispersed around the room instead of being properly filtered. When the facility was closing down and I came in to inspect it, I realized that their general exhaust probably had chemical contaminants and that anyone in the space could have been exposed.

Since the company worked with only small amounts of chemicals, I guess they thought the exposure risk wasn't significant enough to warrant the use of fume hoods. However, by using the chemicals in an open space, not only did they potentially damage the exhaust system, but they also created an unnecessary exposure risk for people in the lab.

The third client was a small lab that used a wide variety of different chemicals. Unlike the second client, they did have a fume hood for working with chemicals. However, when I went to assess the facility, I noticed that their fume hood was badly damaged. The power seemed to be cutting in and out, and it wasn't clear how (or if) it was calibrated. Without a properly functioning local exhaust ventilation system, we were concerned that the chemicals could cause an exposure issue, damage the lab space, or even react dangerously with the metal in the fume hood itself.

The common thread between all three of these facilities is that there was little regard for how the work being performed could affect the space and surrounding environment.
Not having the correct ventilation system increases the risk of damage to the facility and takes a lot of effort to correct. Additionally, a poorly ventilated space results in an increase in the contaminants in the air. Companies may state that they value the safety of their personnel, but a big part of protecting people is protecting their work environment.

> *When setting up a facility, it's incredibly important to understand the risks associated with the work that will be conducted and consider whether the space is equipped to manage those risks.*

These scenarios also highlight the importance of EHS oversight when setting up a facility.
An EHS professional would have flagged the lack of a proper local exhaust ventilation system at these facilities and could have educated the companies on the related risks.
Without internal EHS personnel, the company owners didn't fully grasp the type of ventilation and procedures required to operate safely.

Many facilities are originally built to adhere to a standard design. However, the preexisting ventilation may not be well suited for work that produces fumes, particulates, or other potentially hazardous materials. In these scenarios, the owners of the facilities likely made a lot of assumptions about exposure risks. It should stand to reason that well-operated facilities aren't built on assumptions but rather on due diligence to keep the workspace properly ventilated and the staff as safe as possible.

TROUBLE AT THE LOADING DOCK

I work for a scientific services provider that focuses on three areas: transportation and logistics, cold storage management, and ambient storage. To provide ambient storage services, we store a variety of commodities, including lab consumables, furniture, and lab equipment.

Once, we had a customer who had purchased several pieces of used lab equipment, and they wanted to temporarily store them with us while construction on their lab space was completed. Once finished, they would request the equipment be delivered to their site directly. One of the pieces of equipment was a double-stacked incubator; this consists of two units—one on top, and one on the bottom that can stack together as needed but aren't physically connected to one another. The incubator also has wheels on the bottom, which makes it easy to move around.

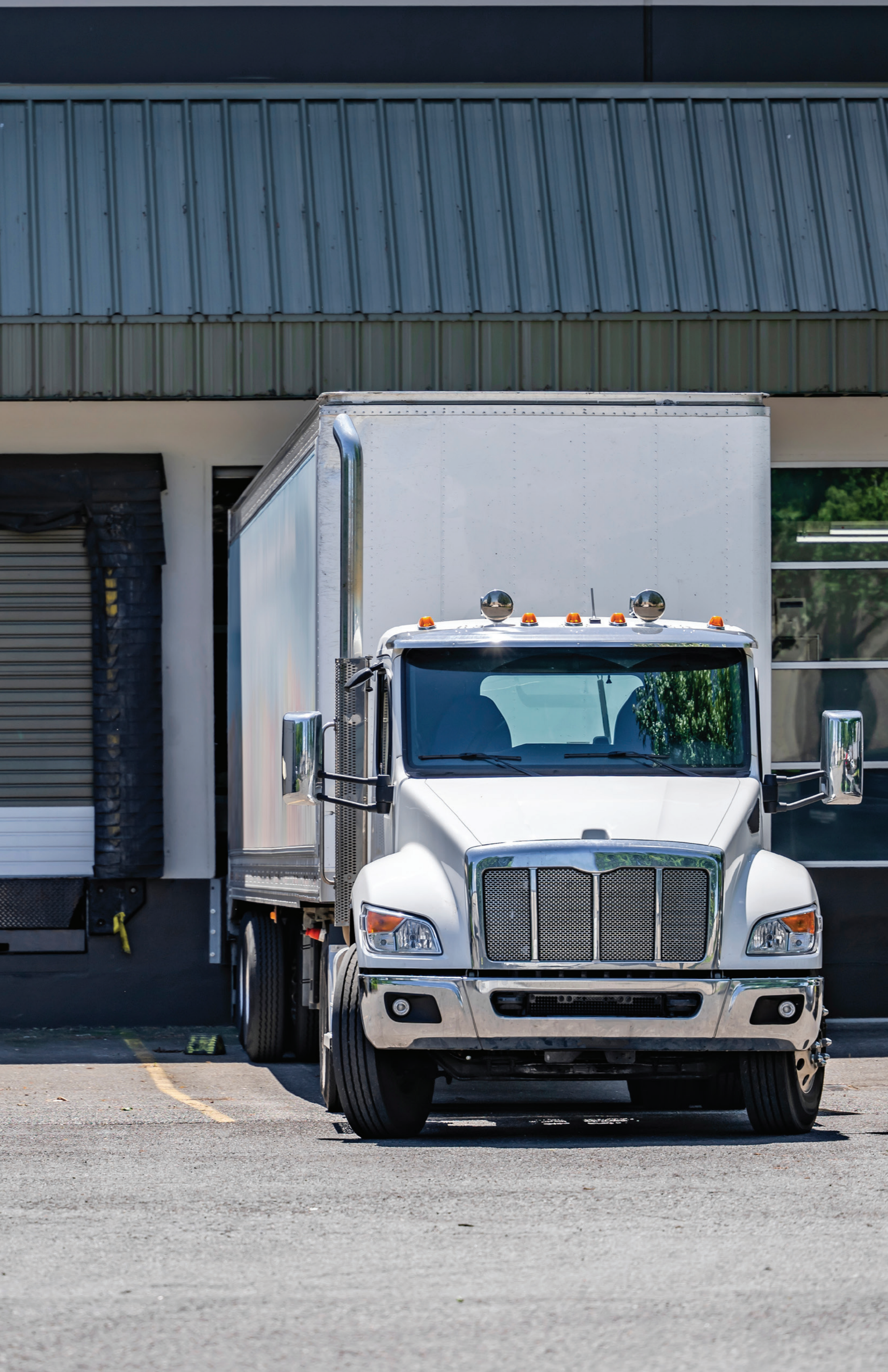
When it was time to deliver the equipment, we were bringing the incubator down to the loading dock to load it into the truck. As we were pushing it, however, one of the wheels got caught in a divot on the ground. The incubator jerked forward, causing the top unit to slide off. While the team could have tried to save the incubator from falling and getting damaged, it's a very heavy piece of equipment. Even with their standard protective gear, someone hit by the incubator could be seriously injured.

The team had to let the incubator fall and incur any resulting damage. Of course, the equipment got banged up and we had to take the loss, but it was better than our staff getting injured.

The small divots and cracks on the ground formed from normal wear and tear. Normally, it's not a problem, but when moving equipment on wheels, uneven areas along the ground can present an additional hazard. Unfortunately, we didn't think about this until it was too late. Since the double-stacked incubator already had wheels installed, moving it that way seemed like the easiest way to get it loaded.

As a corrective action, we're working on filling in the existing divots to even out the surface of the ground. We're also looking for ways to mitigate further damage and avoid cracks in the future. Lastly, we've begun to utilize alternative tools to help us load equipment. Our initial approach to transporting the equipment seemed simple, but ease isn't always worth the risk.

The incident taught us to be more cautious about the condition of the surrounding areas when transporting equipment.



THE SUSTAINABILITY OF SAFETY

Safety and sustainability may seem like they contradict each other. After all, we wear disposable gloves, throw away contaminated personal protective equipment, and use gallons of water to launder reusable lab coats. The truth is, however, that safety and sustainability often go hand in hand. Both are crucial to ensure lab employees have a safe working environment that includes work practices that help minimize the risk of hazardous exposure while at the same time promoting sustainability.

This alignment also helps foster a culture where lab employees are committed to responsible business practices and can implement strategies to maximize efficiency and minimize costs.

In the context of this publication, we wanted to highlight the interconnection between safety and sustainability in life science through a series of interviews with members of Safety Partners' Sustainability Team. The responses of those interviewed show how these two initiatives can be aligned in a realistic, safe, compliant, and responsible way. The goal of this IANM segment is to help resolve misconceptions about safety and sustainability in lab spaces.

Below are several examples of responses to interview questions demonstrating how safety and sustainability can work in alignment:

1. **Gloves**
   Can lab gloves be recycled?

   One common misconception about gloves is that they cannot be recycled because they are contaminated with chemical and/or infectious materials. While this is true to some extent, contaminated and uncontaminated gloves can still be separated, allowing uncontaminated gloves to be collected for recycling. There are several vendors that offer uncontaminated glove recycling services and use the recycled material to make new products.

   On the other hand, gloves contaminated with chemicals or infectious materials cannot be recycled. They must be collected in their appropriate hazardous and/or regulated medical waste containers for proper disposal by an approved waste vendor. The result of segregating contaminated from uncontaminated gloves for recycling helps reduce the amount of lab waste consumption and cost and, in turn, helps divert much of the waste from being sent for incineration and/or landfill.

2. **Fume hood use**
   Does closing fume hood sashes save money?

   Yes, closing fume hood sashes can save money! When fume hood sashes are open, they draw in air from the lab, and this leads to a significant amount of energy being consumed. Actions like closing the sash during experiments, when the hoods are not in use, and before going home can go a long way. An annual energy report from the Louis Stokes Laboratories at the NIH found that 44% of energy used in the labs evaluated was related to ventilation.

   OSHA's Lab Standard (29 CFR 1910.1450) requires fume hoods to function properly and be maintained to protect lab workers from exposure when working

Safe and sustainable practices also help to decrease energy consumption, the production of lab waste, and water usage.

with hazardous chemicals. When the fume hood is not in use, adopting the practice of keeping the sash at the lowest possible operating position has a dual effect of reducing the potential for worker exposures (safety) and reducing energy usage (sustainability). This is a straightforward and responsible practice that not only provides peace of mind and a safer work environment for lab workers, but also delivers substantial energy savings for the facility.

3. **Water Conservation: pH Neutralization System Flow Logs**
   Why is checking flow logs necessary?

   For companies with pH neutralization wastewater pretreatment systems, conducting daily monitoring of the system's flow logs is required to ensure that wastewater discharge consistently remains within the permitted daily limits. If the flow logs show consistent increases in wastewater discharge, this may be considered a violation of the sewer discharge permit, depending on the type of permit held.

   There are several reasons wastewater discharge may unexpectedly increase. For example, there could be a leak from a lab sink faucet, a leak in a piece of equipment (e.g., autoclave, dehumidifier, glass wash/dishwasher, RODI system), or a problem with the pH neutralization system itself such as a stuck valve. It's also possible that there was a laboratory process change. For instance, a scientist may have revised a procedure which requires increased water usage and wastewater discharge down a lab sink. These situations may affect wastewater discharge permit compliance in addition to increasing water usage and cost.

   To address this, we strongly encourage lab and facilities employees to collaborate with safety personnel in thoroughly investigating all potential causes of wastewater discharge increases, ensuring that any issues are identified, corrected, and effectively resolved.

   From a safety perspective, if the increased discharge resulted in a permit violation, the regulatory agency would likely commend the company for its proactive approach in pinpointing the leak's cause and implementing corrective action to ensure compliance. From a sustainability standpoint, addressing water leaks from lab faucets and equipment, not only reduces water consumption and associated costs, but also significantly enhances water conservation efforts.

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Since 1992, more than 900 life science, real estate, and technology firms have trusted Safety Partners to deliver customized, best-in-class EHS programs, training, and permitting.

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