



Online Ethics Center  
FOR ENGINEERING AND SCIENCE

# Hazardous Substances (RCR Role Plays)

## Author(s)

Michael Loui  
C.K. Gunsalus

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## Description

One of nine role play scenarios developed by Michael Loui and C. K. Gunsalus. This page, on dealing with hazardous substances, includes the summary, real summary, and handouts to be given to various participants. *The full role play instructions with discussion guidelines are included in pdf format.*

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## Role-Play Summary

This role-play focuses on the dilemmas in balancing regulatory requirements, personal relationships and a natural reluctance to “cause trouble.” These dilemmas

arise in many settings, and can be particularly acute in laboratories that handle hazardous substances because of the serious safety implications of violations. In addition, violations can carry fines and penalties for laboratories and universities where they occur. The worries of the graduate student in the role-play about potential laboratory shut-downs and corresponding research delays are all too real. Specifics of regulations vary according to the materials being handled. The underlying principles regarding human and environmental safety stay the same.

In the role-play scenario, a graduate student is seeking advice from a fellow graduate student about how to balance concerns about personal safety — their own and that of others in the lab — regulatory consequences and the potential damage to relationships by asking questions about potential violations. What is the student's responsibility to discover whether there are violations? What are the consequences for avoiding knowledge? How should those competing concerns be balanced?

The two students seem to be moving toward the conclusion that the safety issues are serious enough that some action must be taken. At this point, the issue becomes how to raise the issue professionally and in a way that minimizes hard feelings or anger with the student who raises the concerns. To avoid a "shoot the messenger" situation, the discussion should focus on constructive and effective ways to have a conversation with the disorganized adviser about the potential safety problems in the lab.

## **Real Story**

This role-play is an amalgam of real-life situations. The most common problems that arise with hazardous substances in laboratory research are:

- **Pile-up:** Over the years, chemicals accumulate that may deteriorate and create a dangerous situation. For example, very old ether containers with even a small amount of ether that oxidizes can be exceedingly dangerous. This and other situations can become serious enough that the university itself might not have sufficient facilities to handle safely and thus may need to incur expenses with outside contractors. These expenses can be (and often are) charged back to the originating laboratory/PI. These situations are often discovered when faculty leave, retire or simply move from one lab to another.
- **Lab modification:** Similar to the situation in the role-play, labs short on space and long on creativity often convert an area not really intended to be laboratory

space. Ventilation is a major concern, although other safety concerns also arise.

- Mailing: Without any bad motives, simply focusing on getting the work done, researchers mail each other chemicals and samples. Without proper training and precautions, this can become a very dangerous situation—and lead to heavy penalties. Bibliography/resources for participants
- Improper disposal: Particularly at campuses that have charge-back fees to investigators to help cover the disposal costs, “dump and run” can become tempting to researchers and lab staff. Universities have seen this happen with chemicals, radiation and biowaste, and it can again be quite hazardous and carry large penalties.
- Ignorance at the interdisciplinary interface: when researchers in one area venture into interdisciplinary research and either are unfamiliar with the regulations governing the work or have lab personnel (like a post-doc) from the area working with them, and not have sufficient expertise to provide adequate supervision.

The graduate student is right to be concerned both about safety and about the potential consequences of raising the issue. The conversation with the adviser could be very difficult and the student needs to have thought through in advance how to “frame” the conversation in the most constructive possible manner.

An approach that many often start with is to ask questions: “Gosh, in my safety training....” If the innocent question yields results, the problem could be solved. However, one possible problem with this approach that should be considered in advance is what the student’s next step will be if the “innocent-sounding” question is dismissed or shut down, or worse, if the student is explicitly directed to ignore it. If the student is convinced that action needs to be taken because of safety, this could complicate the next step, and should be anticipated in formulating the first approach.

Oversight agencies in the hazardous substances area at the national level are the Environmental Protection Agency (EPA) and the Occupational Safety and Health Administration (OSHA). There are generally state agencies with oversight as well.

## **Advising Graduate Student Role**

What follows is an outline of your role. You will need to improvise to some extent – be creative but try to stay within the bounds of what seems realistic.

You have been a graduate student in your current lab for a few years. One of your fellow graduate students in another lab is pretty sure that their lab violates regulations about hazardous substances in a couple of different ways: first, there's an old closet that was converted (quietly, over a weekend) into more bench space. Second, the student's adviser told a post-doc to clean out a hood that was overflowing with old bottles and other junk. The student saw the post-doc take all the bottles out of the hood, put them in a box and carry them out. Given what you know about how to dispose of hazardous substances safely, none of the proper disposal steps were being followed. In addition, although many of the materials used by lab can be quite dangerous, no information is posted anywhere in the lab on emergency procedures. Your fellow student is concerned about what to do.

You've been thinking about your friend's dilemma with the hazardous substances problem. You agree that there's likely a set of violations here, and you think the ventilation and improper disposal issues could be really serious. You know your friend doesn't want to get anyone in trouble, and also doesn't want anyone to get hurt—or their work delayed because of fines or clean-up suspensions of work. Prepare some advice to give your friend.

## **Graduate Student Role**

What follows is an outline of your role. You will need to improvise to some extent – be creative but try to stay within the bounds of what seems realistic.

You have been a graduate student in your current lab for three years, and you really like it a lot. The lab techs, other students and post-docs are a good group to work with, the atmosphere is positive and supportive and you have a great relationship with your adviser. Your own project is going really well and you're very happy, even if you are working very long hours all the time. The only thing that worries you is how much of a mess parts of the lab are (not your bench or area). To put it nicely, your adviser is disorganized about everything but the ideas for the projects he's working on. His office looks like a tornado hit it and he misplaces everything he touches. The reason you're getting worried is that last year, in the required ethics training, one topic touched upon was regulations about hazardous substances.

You are pretty sure that your lab violates those rules in a couple of different ways: first, there's an old closet that was converted (quietly, over a weekend) into more bench space. You're guessing that the ventilation isn't very good, since it was

originally a closet, and the training really hit on the importance for health reasons of ventilation issues. Second, your adviser told the post-doc to clean out a hood that was overflowing with old bottles and other junk. You saw the post-doc take all the bottles out of the hood, put them in a box and carry them out. Given what you were told in your training about how to dispose of hazardous substances safely, none of the proper disposal steps were being followed. In addition, although many of the materials in use in the lab can be quite dangerous, there is no information posted anywhere in the lab on emergency procedures.

You don't want to cause trouble. You also don't want to contribute to a situation where someone (including you) can get hurt, or the lab could get shut down or fined for violations. The consequences were really stressed in the training. You don't want your projects (or any of those in the lab) to be suspended or delayed. You're trying to figure out what you should do. Where can you get information? What might happen if you do nothing? What options do you have and what do you think you should do? You have been worrying about this and talking with your friend, a grad student in your department, but in another group. You are going to talk with your friend one more time to make a plan for what, if anything, to do.

## **Starting the Hazardous Substances Role-Play**

Advising Student: Hey...

Grad Student: Hi...

Advising Student: Well, I've been thinking about what you've been telling me about this hazardous waste problem...

Grad Student: Yes... I know this can be serious from what I've heard... If the regulations and safety office were to find out we're not complying with the rules, it can lead to very dangerous and serious consequences for the lab...

Advising Student: I agree... I think we should do something... Do you think your adviser cares about the issue?

Grad Student: Yes, I do think so... but for some reason, all of the training that we've had dealing with hazardous waste issues is not even given a second thought in our lab... I feel like the environment in the lab right now is not safe for someone to work in...

Advising Student: Maybe you should approach your adviser... Make sure you're not confrontational...but tell your adviser that you have a personal concern that needs to be discussed...

Grad Student: Right... I don't want to be in the lab and have something dangerous happen... it would be too late for me to say anything...I'd rather approach my adviser before something happened...

Advising Student: So, do you think your adviser is careless about this sort of issue?

## **Observer Role**

- Read both roles on the following pages.
- Watch the interview and take notes.
- If the conversation appears to be stopping early, encourage discussion on topics that still haven't been addressed.

Did the two students work together well?

Is their approach constructive? Do you think it will work?

Are the students anticipating possible future developments from the approach they are considering?

What questions do you think could/should have been considered that were not?

## **Contributor(s)**

Michael Loui

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## **Resource Type**

Case Study / Scenario

## **Parent Collection**

Role-Play Scenarios for Teaching Responsible Conduct of Research

## **Topics**

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