

Ask the Experts

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Do you have a biosafety question and you're not sure who to ask? Send your questions to the "Ask the Experts" column and I'll get them answered for you. Drawing from my own experience or that of other experts in the field, we'll try to compile a thorough and comprehensive answer to your question. Please e-mail your questions to jkeene@biohaztec.com or to Co-Editor Barbara Johnson at barbara_johnson@verizon.net or Co-Editor Karen B. Byers at karen_byers@dfci.harvard.edu.

The Musings of a Biosafety Professional on Containment Facilities

I have been pondering all of the perceived problems, questions and concerns that continually are voiced regarding biocontainment laboratories. Many of these have been addressed in this column, but they continue to surface. Others are pretty much common sense, but, for some reason, we tend to want confirmation of our common sense from our peers. In this column, the first of two on this subject, I'd like to simply comment on those questions that appear to arise most often and hopefully to encourage those of you who read this to try to educate your peers.

Zero Risk

The public and, most likely your administrative personnel, would like us to engineer biocontainment laboratories so that there is "Zero Risk," i.e., no possibility of potential environmental release of the agents contained in the laboratory. No level of engineering or safety procedures alone will ever absolutely insure that release from any biocontainment lab will be prevented. We are at the mercy of mechanical devices that fail and personnel that, even though they are well intentioned, don't always follow procedure, or who, for whatever reason, have an accident and cause a release. What we are attempting to do is to MINIMIZE risk. **This is why it is so important to ensure appropriate design, construction, operations oversight, training, preventive maintenance, and periodic review of the facility.**

Understanding Your Facility

No two containment facilities are alike. They may be designed by the same architect and built by the same construction contractor, but each has its own unique properties. HVAC systems differ in design, containment equipment is different, and construction details are not the same. Biosafety professionals must understand the nuances of the particular design of the facility and provide personnel with an understanding of the "inner workings" of the facility. You cannot rely on what your colleague in another facility tells you about how to operate your facility unless you know what the differences are. **You must develop a facility-specific plan for training, operation, and maintenance.**

Reliance on Your Architects and Engineers

Because many of us are not architects or engineers, we try to obtain the services of people who have done this before. A word of warning, "just because I've done it before, doesn't mean it was done right." We, as biosafety professionals, have a wealth of information that architects and engineers don't have and we need to carefully review their prepared documents and communicate our concerns about any problems we observe. I have found over the years that a good engineer can provide me with great solutions to problems, if I can communicate to him/her exactly what the problems are. Unfortunately, left to their own devices, they will come up with a solution, but it may not be either appropriate or practical for the requirements of laboratory research and containment. Reliance on expertise is fine, but the Biosafety Professional **must** be involved in the development of plans. I have seen too many containment laboratories with excellent engineering and design fail because that engineering and design was not appropriate for the project. **Don't be intimidated by the credentials of the people you hire. You are the client. They are the suppliers of services and they should be listening to your comments and developing a facility which will meet your needs.**

Reliance on Your Colleagues

We all are in this game together and we have to assist one another when problems arise. However, what works for your colleague may not be appropriate for you. Again, I emphasize that each biocontainment facility is unique and we must not rely on what someone else is doing unless we have performed the appropriate risk assessments and are satisfied that the advice we received actually applies to our facility as well as to the facility of the person giving the advice. Your colleagues may have the best intentions, but they may have made an incorrect decision. **I would hate to go to court with the statement, “I did it this way because my colleague did it this way” as my only defense. Every decision must be based on the risk assessment of how that decision will affect your facility.**

Clean Room Equipment

It seems that the Clean Room construction boom is over and Clean Room builders are using their expertise to build containment laboratories. While on the surface, this may seem to be an appropriate thing to do, it is wrought with problems. The most important thing to consider is that the ventilation of clean rooms results in a room under positive pressure. This means that all clean room devices, panels, ceilings, light fixtures, pressure monitors, etc. are built to function best when the room is under positive pressure. Containment laboratories operate under negative pressure, which means that a containment lab fitted out with clean room devices is continually pulling against the seal of the device. In general, the only clean room device that is really appropriate for containment spaces is the pressure monitors that have a diaphragm in their operating system to minimize the potential for contamination to either come in to the clean room, or get out of the containment laboratory. This diaphragm is also particularly useful when a containment laboratory must be gas decontaminated.

If you hire clean-room professionals to design and build your containment facility, then you will have to ensure they understand the requirements for containment and you must ensure the devices installed will continue to operate for safe maintenance of the containment.

Pressurization of Containment Laboratories

Can a containment laboratory ever be allowed to go positive to the outside environment? Theoretically, the answer to that question is NO. Is this practical? NO. It is obvious that when we are dealing with mechanical devices and human error, there is always a possibility that there will be failure. Our job as Biosafety Professionals is to minimize the potential for that failure. The BMBL does not require absolutes and, in the case of BSL-3 containment laboratory pressurization, it requires that “no sustained pressurization” of the laboratory exists. It does not even define “sustained.” We could imagine all kinds of scenarios that would allow for release of agents, should a spill occur outside of a Biosafety Cabinet at the moment that the laboratory went positive to the outside world. Having agreed to that possibility, it is up to the individual facility operator to do the risk assessment and determine how far they want to push the envelope with regard to pressurization. This risk assessment should be based on the effectiveness of the operation of the HVAC system and the perceived or actual hazard associated with release of the agent being used within the laboratory. In addition, appropriate testing of the systems and determination of the potential deficiencies, as well as an aggressive preventive maintenance program, warning systems and training of personnel, will minimize the potential for pressure shift and accidental release. **The integrity of the containment must be maintained to the highest level possible.**

To be continued...

Join a Committee

Have you ever considered joining a committee? When you choose to serve on a volunteer committee, you open up a world of possibilities for networking, professional growth, and career opportunities while serving your profession. Volunteer member groups are the backbone of the association because they: serve as a forum for exchange of information; advance the science in all specialties of biosafety; develop guidelines and standards; provide education and training; and link ABSA to many other institutions.

You should explore committees in areas of the profession where you are active or have an interest. There is a great variety; you can be sure to find one of interest to you. Please review the list of committees and identify those areas in which you would like to participate or contact the chair of the committee (www.absa.org/abocommittees.html) that interests you to find out more information about the committee's goals. You are also invited to attend the committee's meeting during our annual conference or at any other time (all committee meetings are open).