ASIA-PACIFIC BIOSAFETY ASSOCIATION

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REPORT ON THE RUSSIAN BACAC CONFERENCE

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Summary: On November 24-25, IGX/Ellis facilitated a workshop to establish the goals and bylaws of a new Biosafety Association for Central Asia and the Caucasus (BACAC). The workshop was hosted by the Kazakh Scientific Centre for Quarantine and Zoonotic Diseases (KSCQZD) and sponsored by Canada's Global Partnership Program (GPP) and the International Science and Technology Centre (ISTC). Canada's Global Partnership Program is investing heavily in the creation of this association in support of their biosafety and biosecurity initiatives in the region. Participants at the meeting included representatives from Kazakhstan, Kyrgyzstan, Tajikistan, Azerbaijan, Armenia, Georgia and the ISTC. Dr. Ai Ee Ling, Past-President of the Asia-Pacific Biosafety Association (A-PBA) provided valuable insight and lessons learned into the creation and sustainment of a successful regional biosafety association and on organizing annual biological safety conferences. IGX and Maureen Ellis, Past-President of the Canadian Biosafety Association (ABSA-Canada) and the American Biological Safety Association (ABSA), also provided guidance on establishing goals and objectives, retaining members and administrative issues of running a secretariat for the association. The group developed a set of draft bylaws and goals for the BACAC to be registered in Kazakhstan over the coming months. Preparations were made for the 1st BACAC Biological Safety Conference to be held in mid-May 2009 in Almaty, Kazakhstan with continued support from the GPP and ISTC.

1. BACAC Membership. Although the first meeting to establish the Association included participants only from Kazakhstan, Kyrgyzstan, Tajikistan, Azerbaijan, Armenia, and Georgia, the group agreed that Uzbekistan, Afghanistan, Turkmenistan and Mongolia should be invited as active participants in the BACAC. Recognizing the importance of integrating Former Soviet Union (FSU) scientists into the broader international biosafety and biosecurity community, the group also agreed to welcome international members to participate in BACAC activities. IGX reminded the group that the international community can also learn a lot from FSU scientists and that BACAC could play a key role in ensuring global best practices are a balance between highly technical solutions and practical yet effective solutions for working with dangerous pathogens. Membership will be sought from a variety of disciplines involved in biosafety and biosecurity issues (e.g. scientists, technicians, operations and maintenance personnel, lab managers, architects, engineers, security specialists) on both the human and animal health fronts.

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2. Bylaws and Goals. The group reviewed and commented on a draft set of bylaws and goals that was developed by the participants and their legal advisors in advance of the meeting. The document is based on Articles 18, 19, 20, 41, 42, and 43 of the Kazakh legislation governing non-profit associations and the bylaws/goals of both A-PBA and ABSA-Canada. Overall, the document was well developed (and well received by each of the countries present) and provided the much needed framework for the association to conduct its business and activities. Each country provided their unique vision for the objectives of the association and all agreed that final comments on the document would be provided to the KSCQZD by the end of December. Under the leadership of Dr. Atshabar, Director, KSCQZD and with legal assistance, the association would then be registered with the Ministry of Justice in Kazakhstan under their regulatory framework for non-profit associations. The association would then be issued a registration number and seal. Each country agreed to consult their respective legal advisors to ensure participation in the association registered in Kazakhstan would not present any unforeseen difficulties. Formal approval of the final document would take place at the first official business meeting of the BACAC (to be held in conjunction with the 1st annual conference in mid-May 2009)

Photo shows participants at the Russian BACAC Conference. Dr Ling Ai Ee is on the first row on the extreme left while the author is second from left.

3. Secretariat and Administrative Issues. With full endorsement of the group, and financial support in the near-term from Canada's GPP, the KSCQZD will continue to provide secretariat services for the BACAC. Each country identified one key individual who would work closely with the Secretariat in the running of the association. All membership and conference fees will be reasonably priced in order to attract and sustain members from the Central Asian region where funding opportunities may be limited. Dr. Atshabar stressed the importance of long-term sustainability for the BACAC and the need to identify other fund raising opportunities and sponsors. To this end, a brochure and other promotional materials will be developed (IGX provided the secretariat with examples of such materials from other regional associations). A BACAC web-site will also be created and hosted within the KSCQZD Biosafety and Biosecurity Training Centre's website currently under development by Canada's GPP and the KSCQZD. IGX/Ellis and Dr. Ling supported the idea of a small competition to design the BACAC logo with the winner being given 1 year's free membership (both ABSA-Canada's and A-PBA's logos were created in this manner).

4. Executive Council. A formal executive council and committee structure will be outlined in the bylaws and voted on at the first official business meeting of the BACAC. Dr. Ai Ee Ling stressed the importance that executive members are volunteers and that a balance is needed when determining the length of terms of office for key positions (e.g. President-Elect, President, Past-President). A term of two years for President (rather than the suggested 4) would present a more reasonable approach. Positions on the Executive Council would rotate through each of the member countries.

5. 1st BACAC Biological Safety Conference. The 1st Biological Safety Conference of the BACAC will be held at in Almaty, Kazakhstan in mid-May 2009 with support from Canada's GPP and the ISTC (a formal workshop agreement has been finalized to this end). Canada will provide funding via the ISTC for the KSCQZD to host the conference and will sponsor funding for 24 FSU and 10 International speakers. Other sponsors are needed to provide funding for Central Asian scientists to attend the conference. It is hoped that 100 delegates would attend this inaugural event and join the BACAC. The program will include pre-conference courses on topics of particular interest to the region. IGX/Ellis agreed to provide assistance to the secretariat in developing the training courses and scientific program for the conference.

UPCOMING A-PBA EVENTS

- **A-PBA Biosafety Conference 2009 at Philippines, Manila**
  Developed in Partnership with the Asia-Pacific Biosafety Association, Philippines Biosafety Association and Temasek Life Sciences Laboratory

"Biosafety Without Borders"

27 April – 1 May 2009

2 days Pre-conference Workshop plus 2 days Conference

The conference will focus on many relevant and pressing issues facing biosafety professionals in our region. Topics include:

- Global Biosafety
- Asia-Pacific Biosafety – Facing the challenges as one community
- Managing Biosafety – the Challenges
- Animal Pathogens and Containment Challenges
- Biosecurity & Bioethics
- Technologies in Containment Facilities

There will also be a two-day pre-conference workshop, discussing practical issues such as Shipping & Transportation, Risk Assessment, Effective Biosafety Committees and more.

Details on the fees, registration, conference program, sponsorship opportunity and hotel accommodation are now available on A-PBA website.

- **A-PBA Office Bearers 2009/2010 On-line Nomination and Election Exercise**

In the month of February 2009

Dates to be announced later.
In order to be eligible for the exercise, please renew your membership from our website (http://www.a-pba.org) if you have not done so.

INTERNATIONAL CALENDER OF EVENTS

June 15, 2009 Pre-Conference Workshops
June 16-17, 2009 Conference
European Biological Safety Association (EBSA) 12th Annual Meeting
Stockholm, Sweden
Contact: http://www.ebsaweb.eu/

October 18-21, 2009
American Biological Safety Association (ABSA) 52nd AnnualConference
Hyatt Regency Miami, Miami, Florida, USA
Contact: 847-949-1517; Fax: 847-566-4580;
E-mail: absa@absa.org;
Webpage: www.absa.org

November 8-12, 2009
American Association for Laboratory Animal Science (AALAS)60th National Meeting
Denver, Colorado, USA
Contact: http://nationalmeeting.aalas.org/future_sites.asp

BIOSAFETY MANAGEMENT COURSE, SINGAPORE 25-29 AUGUST 2008 - A Personal Perspective of Biosafety

By Mrs Salmah Zaini
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Negara Brunei Darussalam.

When I first started work, only basic laboratory safety was taught but not much emphasis or enforcement of safety was made. Even after the bioterrorism acts that followed the September 11th and the term Biosafety was acted upon, Brunei was still in its infancy with the term and the principles of Biosafety.

When I attended the Biosafety Management course conducted by A-PBA , I was taken aback by the enormity of the situation and the amount of information that was given. I personally had not placed safety and biosafety as the priority in my workplace. I had rather placed it in the back of mind; it was there but not put in good use. Since I attended the course, safety is the foremost when I work, especially as I work in a microbiology lab.

Before I conclude, there was an incident that stuck in my mind and changed my point of view, in terms of Biosafety. My colleague and I were on our way back from attending the Biosafety course, using a taxi. The 'uncle' (driver) was making small talk, asking where we were from, where we going and so on and so forth. Then he asked what we were doing in Singapore and we told him that we were attending a Biosafety course. He laughed and said that we were not good students then. I enquired to why he said that as he only met us that day. He said that he may not understand Biosafety and such like, but he did get the gist of the word safety and I did not comply to the road safety as I did not wear a seat belt. I was so embarrassed but I got the point he was making. Some may agree; some may not but it seemed to me SAFETY and for that matter, BIOSAFETY, requires practice and practice and practice, such that it becomes a habit. It should be part of your daily life, work or otherwise.

Finally, I applaud and thank the A-PBA for a chance for us, especially from the Asia-Pacific region, to gain much knowledge from a very beneficial and useful course.

Session on PPE with David Lam (second from left)

Donning PAPR

BIOSAFETY STANDARD FOR SORTING OF UNFIXED CELLS

Reviewed by Dr Felix Gmuender, RBP, Basler & Hofmann, Singapore

With the advent of cell sorting equipment in the 1970's, it became possible to identify, count and sort individual human, animal, plant and bacterial cells very rapidly. The technique, also called flow cytometry, creates a very fine high-speed stream-in-air of particles suspended and lined-up in a liquid phase on which one or more laser beams can be directed. Particles can be tagged with fluorescent antibodies or chemicals. When the particles pass the laser beams, minute changes in transparency, fluorescence and scattered light is used to count and/or to sort the particles with the desired characteristics. The latter is called fluorescent-activated cell sorting (FACS).

The particles can be anything from plant, animal and human cells to bacteria that are large enough to be detectable by visible light (similar to the limits of light microscopy).

Because the stream-in-air is subjected to high mechanical stress, aerosols can be generated, which can contaminate the equipment, the room, and the operators. For modern equipment, this stream-in-air creates less of a problem than when the nozzle becomes clogged.

Naturally enough, the biorisks associated with these techniques revolve around aerosol generation: Human and animal cells flowing through the sorter can be infected with viruses (e.g. HIV, HBV, HCV). Besides the cells, the stream could contain other agents that can be transmitted via the airborne route (arboviruses, *Francisella tularensis*, *Brucella* sp., *Burkholderia* sp. *M. tuberculosis* etc.). Some cell-sorting applications are actually used to identify bacterial species in the stream, which can originate from clinical specimens (e.g. body fluids) or environmental samples (e.g. water quality monitoring).

In 1994, the International Society of Analytical Cytology (ISAC) became aware of the risks associated with cell sorting and presented the scientific community with a first guideline how to use the technique safely. With the increasing availability of sorters and their ease of operation, numbers of equipment in clinical and research settings have multiplied. This, in combination with higher risk awareness, has made the original guidelines obsolescent. Thus, in 2007, ISAC came up with an improved biosafety guidance document that is presented to the community as a standard (**Schmid, I. et al.: International Society for Analytical Cytology Biosafety Standard for Sorting of Unfixed Cells. Cytometry Part A 71A:414–437, 2007, Wiley-Liss Inc**.).
The 23-page standard deals with all aspects of the cell-sorting associated risks, starting with a risk assessment and concluding with risk-based control elements.

The risk-control strategy includes the classical occupational health and safety management elements: containment equipment for sorters (engineering solution), improved administrative controls (Good Microbiological Techniques or GMT, practices and procedures), personal skills and competencies (training), and personal protective equipment and health surveillance.

In my opinion, the standard should put more emphasis on risk assessment for specific situations. Risk controls given in standards are sometimes applied without thinking and without analysing the lab-specific, activity or equipment-associated hazards (cells, agents, origin of samples, cell sorter model). A proper risk assessment, which include biohazards, forms the backbone of every activity.

Other than that, the standard is in line with the most recent developments in managing laboratory biorisks. To view this article visit the following site *http://www3.interscience.wiley.com/journal/114263212/issue.*

TWENTY CONSIDERATIONS FOR A SUCCESSFUL BSL-3 DESIGN

By
Ted Traum, PE (World BioHazTec Corp.)

The pathway to a successful BSL-3 project lies in the approach and attention to detail in the design process. The following are twenty suggestions for achieving a research program-driven design:

1. Team approach:
Completing a BSL-3 project is a team effort. It involves the creativity of the designer, the forthcoming of the users, the wisdom of the regulator, the ingenuity of the contractor, the experience of the certifier, and the restraint of the financier. Developing a design that meets the needs of the research program and then following that plan is a team effort. The team needs to be led by the Biosafety Officer who focuses the team on the intended use of the laboratory now, tomorrow, and in the future. The team needs to be aware of the project budget and operating maintenance costs associated with each major design decision. The financier not only needs to be vigilant about projected construction costs but needs to be cognizant of the impact of design decisions on operating costs. Time spent in planning and analysis is money saved in design and construction. Projecting operating and maintenance costs provides for a sustainable design.

2. Checklists:
Developing checklists for compliance with applicable guide-lines and regulatory requirements, facility standards, biosafety policies and practices, and equipment preferences will identify issues that the designer needs to address. These are tools for ensuring that the design addresses the needs and concerns of the users, stakeholders, regulators, and certifiers.

3. Pathways drawings:
Architectural drawings should show the pathways for personnel, materials, and waste. They should also include emergency exit pathways and gathering points. This analysis will unearth inefficiencies and bottlenecks which can be resolved as part of the design process.

4. Decontamination provisions:
Typically, laboratories are surface decontaminated. Gaseous/vapor decontamination is infrequently utilized. Defining when and how often a laboratory will need gaseous/vapor decontamination is necessary to determine if there is a need to purchase decontamination equipment or if contract services will defray this type of capital investment. A decision to own decontamination equipment is not only a capital investment decision, but it is also an operational decision which requires funds for annual training and validation of the decontamination system. The users need to decide the method of decontamination so the designer can develop provisions in the design.

5. Adequate storage space:
Provisions for storage in the anteroom should include space for PPE storage and maintenance (charging of power packs), waste containers, sign-in books, storage/ securing of personal items, toweling, hand-washing soap, cleaning materials, and hanging of lab coats where applicable. Space for storage of the autoclave cart needs to be provided. Laboratory storage should be limited to what is needed for the research program. Shelving should be fixed or be the friction-lock adjustable shelving type. Adjustable shelving with hole-type adjustments is a pest management and decontamination issue. Cardboard should not be stored in the laboratory, therefore provisions for plastic containers should be considered for storing loose items.

6. Cleanability of surfaces:
Ceilings, walls, and floors need to be smooth and cleanable. Design details need to address how surfaces mate together, how they are sealed and finished, specify type of caulk, its color (for maintenance and inspection), and shrinkage requirements. Performance standards for acceptability of caulked joints need to be defined. Surfaces need to be selected for their resistance to chemicals, organic solvents, acids, alkalis, and most importantly, to surface decontamination disinfectants and gas/vapor decontamination processes.

7. Casework:
Surface decontamination is the primary method by which most labs are decontaminated. Selecting wall-hung counters and moveable casework to facilitate cleaning should be considered.

8. Doors and frames:
Doors need to be self-closing. Doors for change rooms need to provide privacy. Laboratory doors need to have vision panels so one can see if anyone is on the other side of the door. Door frames need to be rigid so the airflow around the door remains constant with door usage. Hardware needs to be filed so there are no sharp edges which can cut a person and/or their PPE on entry into the laboratory.

9. Penetrations:
Sealing of penetrations is important from energy consumption, air pressure differential, HEPA filtration,

pest management, and decontamination perspectives. The design must provide details for sealing penetrations and performance standards for acceptability of sealing work. Sprinklers often present a challenge if they are not pendant type.

10. Room airflow distribution:
Placement of diffusers and exhaust grilles can affect the airflow of the biosafety cabinet and can cause indoor air quality issues. A reflected ceiling plan must take into account the location of the biosafety cabinet, and sedentary work stations in relationship to placement of diffusers. The engineer should work closely with the architect in coordinating these locations and selection of devices. Diffusers, exhaust grilles, and exhaust inlets of caging are penetrations in the ceiling and need to be sealed. These details need to be provided in the reflected ceiling plan.

11. Directional airflow:
Directional airflow must be designed so that under any laboratory condition the air does not reverse. A drawing should be developed which shows the pressure differentials at each door. The design air balance needs to create directional airflow measured by pressure differentials at each containment barrier door. The design of the laboratory needs to take into consideration building effects from elevators, stack effects, adjoining independent HVAC/ exhaust systems, and loading docks. In an HVAC/exhaust system failure scenario, building effects can reverse the airflow in containment if not addressed in the design process.

12. HEPA filtration:
If the program or regulations require exhaust HEPA filtration then consideration needs to be given to either central or local HEPA filtration. Local HEPA filtration is either at the exhaust intake or in the branch duct from the exhaust intake at the room level. The issues with room level HEPA exhaust are decontamination and testing of the HEPA filter. With local HEPA filtration, the issue is the number of units that need to be tested annually. This cost needs to be evaluated against the cost of decontamination and testing of a single HEPA filtration unit.

13. Redundancy:
Unless there is a Class III cabinet being used for aerosol experiments, a redundant exhaust fan is all that is necessary for a BSL-3 laboratory. These fans perform best during failure scenarios if they are operated together at reduced speed. Redundant air handling units are typically reserved for containment laboratory facilities housing animals. Redundant air pressure differential gauges at the entry to the anteroom and at the entry to the laboratory provide laboratory personnel the assurance that the laboratory is working properly. Redundant HEPA filtration units are only necessary if an animal laboratory needs to operate continuously.

14. Maintenance provisions:
Space for maintenance of equipment, removal/replacement of components, and decontamination of system components need to be provided as design details. Control exhaust valves are of particular concern and their placement is a decontamination/maintenance issue if they are upstream of the HEPA filter.

15. Sinks:
In order to prevent aerosols generated by the water impacting the sink bottom, the designer needs to consider specifying deep well sinks in combination with controlling water pressure. Selection of hands-free devices for faucet operation (elongated wall attached foot pedals, infrared sensor, rod-operated valve, knee valve, or floor pedal) should be based on maintenance requirements as well as the experience of the facility's maintenance personnel. Regardless of the designer's choice, the faucet should not have handles of any type which personnel could touch. If a hose bib is attached to the faucet, it should have a hose attached, which does not extend below the sink's rim if not protected by a backflow preventer. Backflow preventers are usually required on laboratory faucets and are recommended provided that they will be maintained.

16. Gas cylinders:
Gases should be piped into the laboratory as part of the design. Piping penetrations should be sealed around the pipe. Escutcheon plates are not recommended. Provisions for bottled gases should be made outside the laboratory so bottles can be changed from outside of containment.

17. Lighting and sound levels:
Proper lighting levels are necessary for performing tasks, data entry, and cleaning. Task lighting should be considered that is conveniently switch-operated from a work station. Lighting levels are also needed for security cameras to be effective. Glare on biosafety cabinets needs to be minimized. Provisions for emergency lighting for securing research materials and safe egress are required. Limitations on noise should be part of the design criteria. The noise criteria levels specified by the designer should account for owner- specified equipment noise such as biosafety cabinets, freezers, and centrifuges.

18. Communications and security wiring:
Design of wiring for communication and security devices needs to have the same detail as for electrical wiring devices. Penetrations need to be sealed and devices caulked smooth and cleanable. Provisions for computer stations that are ergonomically designed and placed in close proximity to the data generation point are time- saving design elements. Another consideration is the placement of the computer's fan so it does not cause a disturbance to the biosafety cabinet. Also, the cords for the

computer, monitor, keyboard, and other peripherals need to be harnessed so they are not draped on the floor and can be easily cleaned.

19. Circuit breakers:
Electrical panels should be located outside of containment so maintenance personnel do not need to enter containment. Additionally, the receptacles within containment need to be marked with breaker identification so in the event of a tripped breaker, the researcher can direct the maintenance personnel from within containment to which breaker needs resetting.

20. Emergency power:
Choices for emergency power systems are usually left to the designer. The users need to provide direction as to their emergency power needs, either total or partial emergency power. Consideration should be given to a dedicated emergency generator for the laboratory rather than utilizing the building emergency generator for reliability reasons. Regardless of these choices, the equipment served by these systems may need uninterruptible power supplies if they are computer controlled. Ideally, a total emergency power system with a local emergency source should be considered.

In analyzing the final design, emphasis needs to be placed on the details. Constant referral to the research program requirements, project construction and operating budgets, and the completeness of the design documents are essential to a successful design which meets the users and the stakeholders needs, and provides sustainability which will culminate in a safe and secure research facility.

BIOSAFETY TRAINING TOOLS ON THE WEB

The Mississippi State University Office of Biosafety, under the direction of Patricia Cox, has produced an outstanding movie on the hazards associated with not following biosafety practices. The movie is set in a typical laboratory that could exist in any college, hospital or private industry. The myriad of errors that can occur is stunning and extremely well choreographed.

"**Lab Wars Episode III: Revenge of the Bacterium**" transcends national guidelines and provides a great learning and training tool for people across various experience levels. Not only does it eloquently demonstrate poor biosafety practices, but takes training to another level by demonstrating the results of those practices in terms of laboratory acquired illness, reporting requirements and how research programs can be negatively impacted. It is a wonderful training tool and will provide an interactive forum for trainers and trainees.

To view the movie visit:
http://vimeo.com/2578088?pg=transcoded_email&sec=2578088

or find the link on the A-PBA website.