

## An Interview with Prof Y S Wong, VP-AB, on Environmental, Health and Safety Management at HKUST

*While our President carries the overall responsibility towards ensuring environmental health and safety (EHS) of our campus community, the implementation of HKUST's EHS program falls within the oversight of our Vice-President for Administration and Business. In this connection, Prof Y S Wong, who chairs the University's EHS Committee, also oversees the operation of the Safety and Environmental Protection Office. Here is a summary of an interview with Prof Wong on EHS management:*



Q: As we know, the Vice-President for Administration and Business is delegated the authority and responsibility to oversee all environmental, health and safety matters at HKUST, how do you want the campus community to understand this role of the VP-AB?

A: I hope the campus community will see that the University takes EHS matters seriously. HKUST is committed to ensuring all our activities, be it teaching, research, administration, facility development and maintenance, or even recreational and residential activities, will not adversely affect the health and safety of our staff and students, or the quality of our physical environment.

Q: What is your expectation for members of the campus community in EHS matters?

A: I hope members of the campus community will also take their individual EHS responsibilities seriously. Faculty and staff members of the Environmental Health & Safety Committee will help me establish policies and monitor overall performance. Department and unit heads are to ensure effective safety management in their units, with the assistance of Departmental Safety Officers and Deputy DSOs. Faculty members play a crucial role in ensuring research safety of staff and students under their supervision. All supervisors should look after health and safety of their people, and every staff and student should always be mindful of the health and safety of themselves, and others around them.

Q: What role do you expect SEPO, the Safety and Environmental Protection Office, to play?

A: SEPO was established since the very beginning of the University and its staff helped the senior management formulate the EHS policies and programs. SEPO continues to be responsible for implementing university-wide EHS programs, and assisting departments and units in implementing their departmental safety programs. Necessary technical and management expertise in various safety and environmental disciplines have been secured to establish SEPO as a resource center for all EHS matters. In fact, it is a resource center not only for the University, but the whole community. Due to the scarcity of EHS expertise locally, SEPO has been requested by the Government and other public organizations to assist them in various EHS initiatives, and has helped establish HKUST to be one of the local leaders in the EHS field.

Q: Do you have any final words of wisdom to share with the campus community on EHS matters?

A: Well, I think the most important thing to remember is safety is not only about practice or doing things in the right way, it is more about members of our campus community acquiring a proper attitude, about establishing a positive culture on campus, and incorporating EHS as a value of the whole institution. If we each play our parts and integrate environmental health and safety practices into everything we do, I'm sure not only will we continue to enjoy a safe, healthy and environmentally friendly campus, but at the same time, we will set an example for the community, and will propagate the environmental, health and safety value beyond HKUST through our staff, students and alumni.

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## Another Way to Change for the Better

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*This article is contributed by Dr Sarah Ho, who is a Research Assistant Professor working in Prof Andrew L Miller's lab (BIOL).*

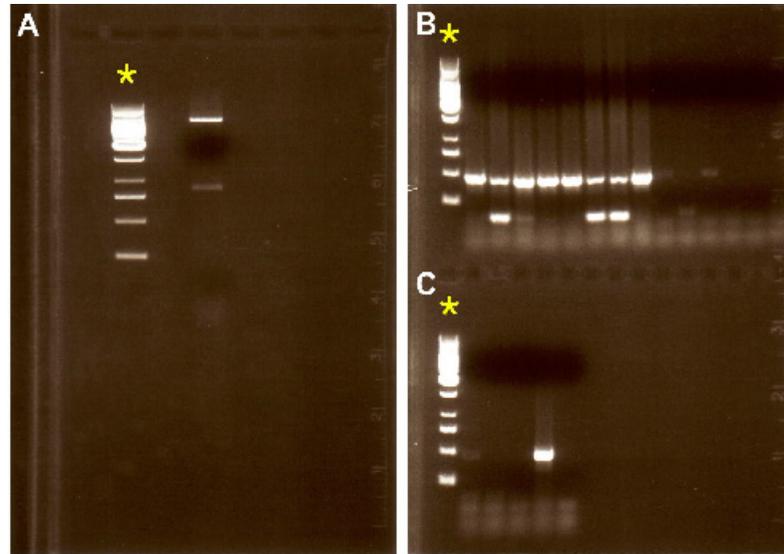
As a postscript to Prof David Banfield's interesting article "**A Change for the Better**" in the last issue of Safetywise, where he described his switch to SYBR Safe (a safe alternative to ethidium bromide; EthBr) for staining gels. In our lab we have recently started to stain our gels with the GelRed nucleic acid stain. We previously tried SYBR Safe but were not greatly impressed with its sensitivity, when compared to EthBr. We then started a search to find a commercially available non-toxic nucleic acid dye that had the same (or similar) sensitivity as EthBr. It didn't take us too long to track down another product, called GelRed, which is a red fluorescent nucleic acid stain that has a very similar spectrum to EthBr, so the same transilluminator can be used for visualizing stained gels. Regarding its sensitivity, while no direct comparisons have been made between gels stained with GelRed and those stained with EthBr, members of our lab who have been using GelRed on a regular basis (and who were not quite impressed with SYBR Safe's sensitivity) are satisfied with its performance.

Like SYBR Safe, GelRed is supplied as a 10,000X stock solution and the manufacturer recommends that 5  $\mu$ l be used to stain a 50 ml gel. The only disadvantage that we see so far is that GelRed is more expensive (i.e., HK\$790 per 500  $\mu$ l) than SYBR Safe (~HK\$400 for 400  $\mu$ l). On the whole, we do not do a lot of DNA or RNA work in our lab, but we certainly agree with Prof Banfield when he says that as safe nucleic acids stains are now readily available, it is no longer necessary to use EthBr. The extra money is worth spending when considering the health and safety of the students and research staff who are in contact with these chemicals on a daily basis.

If you would like further information about our experience with GelRed, please contact Prof Miller's technician, Mandy Chan (ext. 7324).

*GelRed is from Biotium, 3423 Investment Blvd, Suite 8, Hayward, CA 94545, USA.*

*Web-site: <http://www.biotium.com/>*



Representative examples of 1% agarose gels stained with GelRed. To give you an idea of the sensitivity of this dye, the lanes marked with the yellow asterisks were loaded with (A) 7  $\mu$ l and (B,C) 5  $\mu$ l of the GeneRuler™ 1 Kb DNA ladder. (Gels were contributed by Dr Maggie Li, a Visiting Scholar in Prof Miller's lab.)

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## USA National Safety Council Recognizes HKUST's Environmental Health and Safety Management Effort

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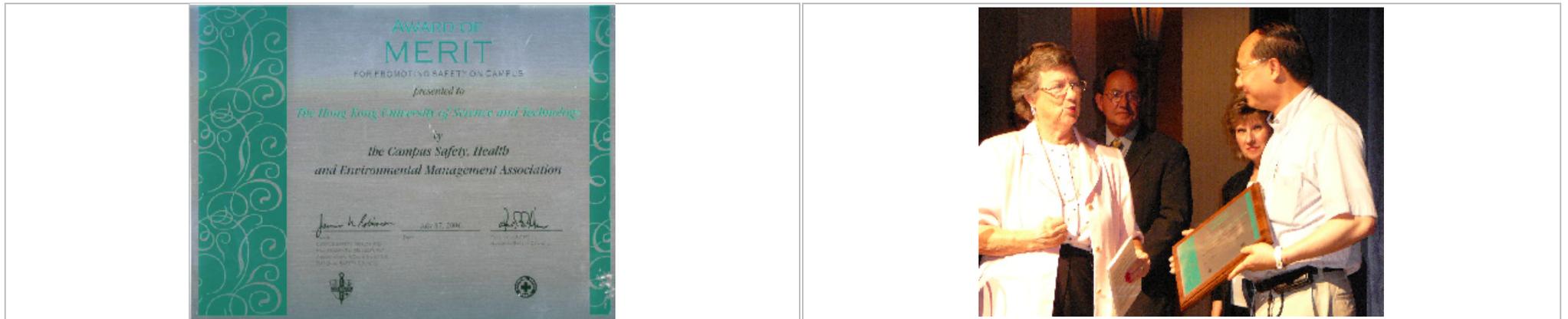
HKUST received an award of merit from the National Safety Council, USA, for outstanding organization and performance in safety management. Each year, universities around the world can participate in this recognition scheme by submitting details on their environmental health and safety program for evaluation by the Campus Safety, Health and Environmental Management division of the National Safety Council. Besides the safety management scheme, specific program elements in radiation safety, chemical safety, biological safety and environmental management are also assessed. In addition to providing documentation of program details, the participating institution also needs to demonstrate records of implementation. The goal of this scheme is to measure the performance of a particular campus against a set of international best practices. How well a program meets established criteria will determine if an award level is achieved and if so, what level of an award. More importantly, in the process, it will provide the participating university an independent review of its level of performance relative to established best practices, identify areas of strength and weakness and suggest further improvement needs.

This year, only 3 universities were recognized, all in the award of merit category. HKUST shares the stage with the University of Notre Dame and the University of Southern California.

HKUST is the first and only university in the Asia-Pacific rim to get such award. Since its inception, HKUST management has always been committed to ensuring health and safety of the campus community as an important priority. An environmental health and safety management system with defined roles for all levels of personnel, from the president to individual staff and students has been established. SEPO was formed to provide necessary expertise support to address a variety of potentially hazardous operations involved in our research, teaching, and facility operational work. Policies and procedures were assembled and communicated, and compliance monitored. Many training courses have been organized to provide safety information on the variety of physical, chemical and biological hazards encountered. Where necessary, exposure to hazardous agents has been monitored and concerned colleagues and students are enrolled in medical surveillance programs. A risk assessment/management scheme has been established to anticipate, recognize, evaluate and control the variety of health, safety and environmental risks associated with the variety of activities on campus. Periodic inspection and audits have been conducted to evaluate performance and to identify improvement needs. In the unfortunate occurrence of accidents and incidents, investigations were conducted to learn from the situation and to make necessary improvements to prevent a recurrence. For new technologies such as biotechnology and nanotechnology, the pace of risk evaluation and management effort parallels advancements in these fields to ensure that our researchers and students are not exposed to uncontrolled hazards in the course of making new discoveries.

Thanks to all colleagues and students, over the past years, our campus community has not only been able to sustain these practices; collectively, we have also been able to establish a local bench mark on EHS management and through experience sharing and collaboration, HKUST has been able to positively impact other local tertiary educational institutions as well as institutions in neighboring countries/territories. Sustaining sound safety management practices and maintaining a good safety culture on campus are not

only important in ensuring a safety and healthful work and study environment on campus, it is also important for our students and visiting scholars to experience how safety, health and environmental protection issues are integrating into every aspect of university work and campus life. As many of our students and visiting staff come from areas where safety culture is lacking or just evolving, we can make an impact by integrating our EHS culture and practices as a part of their academic training or work experience so that they can bring these experience back home to help further promote this culture elsewhere. In this connection, SEPO wishes to thank colleagues and students for their contribution to the EHS management program and we look forward to further collaboration in the future. Together, we can reach new heights and make further contributions to this worthwhile cause.



On behalf of HKUST, Dr Joseph Kwan, Director of SEPO, received the Award of Merit for Complete Safety Program from Ms Martha McDougall, Co-Chair of Awards and Recognition Committee of Campus Safety Health and Environmental Management Association (CSHEMA).



## Indoor Air Quality on Campus - One Step Further

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Indoor air quality has been a focus of many safety and health related discussions on campus for the last couple of years. A Working Group was established in spring 2005 to address occupants' concerns over the health impacts as a result of exposures to radon in offices. While the Working Group concluded that the average level of radon to which individuals were exposed during a normal working day was within the Indoor Air Quality (IAQ) Objectives established by the Indoor Air Quality Management Group of the HKSAR, the Working Group also went further to establish a performance target for the ventilation system. The goal is to achieve a target of an average radon level of 150 Bq/m<sup>3</sup> or below from 8:00 am to 10:00 pm, Mondays to Saturdays in the office blocks. The performance target established by the Working Group is a step further ahead of the IAQ Objective which considers the IAQ in an office environment as good and excellent when average radon level is kept below 200 Bq/m<sup>3</sup> and 150 Bq/m<sup>3</sup> respectively during an 8-hr period when highest occupancy is expected in normal working day. Whereas the performance target established by the Working Group strives to maintain an average radon level in office areas to or below 150 Bq/m<sup>3</sup> for at least 14 hours during weekdays.

The University has recently completed the upgrading and re-fitting of the air-handling units in Zones D & E of the office block as a commitment to achieve the performance target established. The new systems provide more fresh air to the zones and thus, further reduce the average radon level to which occupants may be exposed. Detailed measurements have shown that average radon level in areas which previously had radon levels approaching 200 Bq/m<sup>3</sup> has been reduced significantly. The average radon level recorded in these areas from 8:00 am to 10:00 pm during weekdays is well under 150 Bq/m<sup>3</sup>. In many cases, the average radon level remains below 150 Bq/m<sup>3</sup> for an entire 24-hr period during weekdays. Furthermore, efforts have been made to rearrange the operating schedule of the ventilation system to ensure radon accumulated during the night when the ventilation system is shut down will be reduced to an acceptable level before occupants return to work in the morning.

The same approach has been applied to areas within the Academic Building where average radon levels have always been low. Ventilation schedules in these areas have been rescheduled to start 1 to 2 hours earlier than the previous schedules to achieve optimal IAQ comfort for the occupants. In fact, the real-time radon measurements recorded in many of these offices satisfy the performance target by a wide margin and reveal no time from 8:00am to 10:00pm will occupants be exposed to a level higher than 150 Bq/m<sup>3</sup>.

SEPO, with the assistance of EMO, will continue a program to monitor radon levels throughout the main campus building and ensure the performance target continues to be met.



## Radon - Q and A

A periodic table of elements with the element Radon (Rn) highlighted in a red circle. The atomic number 86 is shown above the symbol Rn. The table includes elements from Hydrogen (H) to Oganesson (Og).

Radon is a naturally occurring, odourless, colourless, radioactive gas produced by radioactive decay of radium-226. Radium is naturally found in most soils and rocks, particularly in granite. As radon gas further decays, a series of tiny radioactive particles are formed. When either the gas or these particles are breathed into the lungs, some are deposited and will continue to emit radiation. Life-long exposures to high levels of radon can cause lung cancer.

### Why indoor radon level is potentially higher in Hong Kong?

Granite is widely used in concrete for building construction in Hong Kong. Significant levels of radon may be found in any floor of any building using concrete as a major building material. As the radioactive half-life (the time taken to reduce the activity of a radioactive isotope to one-half of its original activity) of radium is about 1600 years, the level of radon contributed by building materials containing radium in a building is likely to be constant throughout the building's lifetime and is expected to be about the same in old buildings as in new buildings.

### How can we reduce radon exposure at home?

The simplest way to reduce indoor radon exposure is to improve ventilation. At home, residents are recommended to open windows regularly to facilitate natural ventilation. There is a common misconception about switching on the ventilation valve of the window-type air-conditioning unit and thinking that there is sufficient amount of fresh air coming into the room. While it may help a little, the amount of fresh air drawn through the air vent of the window-type air-conditioner may not be adequate to reduce the radon accumulated when all the windows are shut for better air-conditioning. Residents are advised to keep some windows open slightly while running the air-conditioner or keep windows open when the air-conditioner is not operating.

## **How is radon managed on campus?**

In offices, control of indoor radon relies on mechanical means. The ventilation system on campus is so designed that fresh air is drawn through the Air Handling Unit (AHU) on top of each building zone and supplied to the fan-coil units located on each floor. Different from the AHU, the main function of the fan-coil unit is to provide finer temperature regulation and better local circulation of indoor air in offices. Depending on the location and layout of the floor plan, one fan-coil unit may serve one or more offices at the same time. Turning on the fan-coil unit will not speed up the removal of radon unless the unit receives enough fresh air supply from the AHU.

All AHUs are controlled by a central, computerized system which operates on a fixed schedule whereas the fan-coil unit can be controlled, to a certain extent, by the control switch which occupants may find in their offices. The control switch regulates primarily the speed of the fan of the fan-coil unit, and thus allows localized control of air circulation and temperature regulation. However, the control switch is only functional when the fan-coil unit is activated. The operating hour of the fan-coil unit is regulated by preset schedule as well. The operating schedule of the fan-coil unit does not necessarily follow the same schedule that controls the AHU operation. For majority of the offices, the AHU system starts 1 to 2 hours earlier than the fan-coil system, which helps to reduce radon accumulated over the night to a more acceptable level. This is also where, from time to time, confusion had occurred as some occupants thought that the ventilation system was turned on only at about 8:15 am when they first heard the fan of the fan-coil units in their offices start operating. In fact, the AHU has been turned on much earlier without the occupants really noticing it.

## **If I feel cold in my room, does it mean I am getting plentiful supply of fresh air?**

Not necessarily. As explained previously, the fan-coil unit is responsible for temperature control in an office but it does not have much influence on the amount of fresh air supplied to the office. The fresh air that is needed to dilute radon in the office is supplied by the AHU which operates independently.

## **How is the operating schedule of the AHU determined?**

The AHU system is designed to provide sufficient fresh air to satisfy the occupants' biological needs as well as to maintain optimal indoor air comfort to the office population during regular office hours. Depending on the size of the AHU, population and the activities in the zone, some AHUs may operate for longer operating hours than the others.

However, they all satisfy the performance target established by the Working Group for achieving an average radon level of 150 Bq/m<sup>3</sup> or below during the hours from 8:00 am to 10:00 pm, from Monday to Saturday. At the same time, other performance parameters such as fresh air input requirements, temperature and humidity controls, carbon dioxide level management, etc. are achieved.

As the ventilation system is not designed for operating 24 hours nonstop, some degree of radon accumulation is expected when the ventilation system is shut down. In the office environment, accumulation of radon usually rises to a peak level in the middle of the night and returns to a low level when the ventilation system starts operating again in the morning. As the ventilation system in the office area is completely shut down on Sundays, higher radon levels are expected in offices on Sunday as compared to the

weekdays.

### **Should I open windows to reduce radon level in office?**

The office blocks are serviced with centralized air-conditioning. To achieve optimal effectiveness, the office blocks should be maintained as an enclosed compartment. Open windows in offices will upset the air balance within the office block which in turn, will affect the effectiveness of the system and the indoor air quality of the office block as a whole. Moreover, open windows in offices may introduce warm, moist air into offices and may cause condensation problems when the outside air mixes with the cool indoor air especially in a hot, humid summer day. From previous experiences, indoor condensation may lead to indoor biological contamination problems, causing some acute health concerns which may include hypersensitivity pneumonitis, chronic fatigue syndrome, etc.

### **If all the offices are receiving centralized air from the main system, how is it possible that the radon level recorded in one office differs significantly from another office down the corridor?**

The difference in level of radon recorded is a reflection of how much fresh air is delivered to a given office as compared to others. AHU supplies fresh air to offices through a labyrinth of air ducts. The amount of fresh air received on each floor and office is regulated by control valves located at various positions along the pipe duct. The degree of opening of the control valve determines how much fresh air an office is receiving. Balancing of the fresh air supply by tuning the degree of opening of the fresh air control valve usually helps to reduce the difference in amount of fresh air received in each room, thus reduces the difference in radon level detected. The amount of time an office door is opened can also affect radon level. There is also a tendency for offices located at the distant end of the air ducts receiving lesser amount of fresh air than those located at the front end partly due to loss of air momentum as well as imbalance of fresh air received in each room. Adjustment of the fresh air distribution will be carried out by EMO colleagues as needed.

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## Report Work Related Injuries And Illnesses Promptly

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There were a number of cases in which staff members reported their work related injuries and illnesses a long time after they had happened. The time lag for one extreme case was more than 3 months. There may also be cases that were not reported at all. Late reported cases mostly involved back injury and other musculo-skeletal type disorders which, in general, may not exhibit early pronounced symptoms.

Reporting work related injuries and illnesses promptly is very important. From accident prevention point of view, prompt reporting enables early investigation of the causes and formulation of appropriate health and safety control measures to prevent similar incidents from recurring.

Prompt reporting of injury and illness can also ensure that immediate assistance can be given to the affected person, such as proper medical treatment and appropriate work adjustment according to the health condition of the person. In one of the cases, a colleague's back was injured during work but he did not report the incident to his supervisor. As a result, his supervisor, without knowing that his back had been injured, continued to assign regular tasks to him. Eventually his back problem was further exacerbated. By the time he brought up the problem to his supervisor, which was several months after the initial injury, his back injury had become much more serious than before.

Late reporting of injury and illness will also complicate the insurance claim process, which will be a disadvantage to both the injured person and the University. Since most insurance policies have a limited reporting period, claim reported beyond the reporting period will not be processed and insurance benefit will not be provided.

There may be many reasons for not reporting or late reporting of work related injuries and illnesses by employees. While we should do our best to work safely and prevent accidents in the first place, in the event of an accident, we must report the case to our supervisors as early as possible. Supervisors should also remind colleagues of this important procedure. Furthermore, supervisors should promptly fill out an accident/incident report, assess the situation and make suggestions for preventing recurrence and implementing corrective actions. Upon receipt of the report, SEPO will provide further comments and conduct follow up as needed.

