

Issue Date : January, 2014

Safety and Environmental Protection Manual

Safety Requirement Summary

Important Phone Numbers and Fax Number

Reporting ALL Campus Emergency (Security Control Centre) 8999 or 6565

Enquiry of Security Matters (Security Control Centre) 6565

Enquiry of General Safety Matters (Health, Safety and Environment Office) 6512

Fax Number (Health, Safety and Environment Office) 2335 0074

This pamphlet is excerpted from the HKUST
Safety and Environmental Protection Manual.

TABLE OF CONTENTS

| | | |
|------------|---|----|
| CHAPTER 1 | POLICIES AND MANAGEMENT..... | 1 |
| CHAPTER 2 | WORK PLANNING AND PROCEDURES | 2 |
| CHAPTER 3 | EMERGENCY PROCEDURES | 4 |
| CHAPTER 4 | TRAINING AND EDUCATION | 5 |
| CHAPTER 5 | ENGINEERING SAFETY | 6 |
| CHAPTER 6 | FIRE SAFETY | 9 |
| CHAPTER 7 | GENERAL LABORATORY SAFETY | 10 |
| CHAPTER 8 | CHEMICAL SAFETY | 11 |
| CHAPTER 9 | BIOLOGICAL SAFETY | 12 |
| CHAPTER 10 | RADIATION SAFETY | 13 |
| CHAPTER 11 | LASER SAFETY (CLASS 3 AND 4) | 14 |
| CHAPTER 12 | OCCUPATIONAL HEALTH AND MEDICAL SURVEILLANCE | 15 |
| CHAPTER 13 | PERSONAL PROTECTIVE EQUIPMENT..... | 17 |
| CHAPTER 14 | OFFICE SAFETY | 18 |
| CHAPTER 15 | TRAFFIC SAFETY | 19 |
| CHAPTER 16 | HAZARDOUS WASTE MANAGEMENT | 20 |
| CHAPTER 17 | WASTE MINIMIZATION | 21 |
| CHAPTER 18 | RESOURCE CONSERVATION | 22 |
| CHAPTER 19 | LIQUID EFFLUENT | 23 |
| CHAPTER 20 | AIR EMISSIONS | 24 |
| CHAPTER 21 | NANOMATERIAL AND NANOTECHNOLOGY..... | 25 |

CHAPTER 1 Policies and Management

- University assumes all reasonable directives possible to protect its appointees, students, facilities and the environment.
- Employees and students assume responsibility for assuring their own safety by complying with this program and following any additional management instructions. They should also recognize hazards related to their work and seek assistance in managing these hazards.
- Heads of departments are required to put their efforts in setting up an appropriate management program in their departments and to conduct audits at appropriate intervals to ensure that health and safety matters in their departments are under control.

CHAPTER 2 Work Planning and Procedures

- Department Heads and Office Directors are required to ensure that responsible persons identify hazardous operations (i.e. risk assessment) and implement relevant engineering, administrative and personal protective equipment type controls.
- Authorization, Permit or Operational Safety Procedure (OSP) are required for the following types of operations at HKUST:
 1. Confined Space Entry.
 2. Work with Class 3R or 4 lasers.
 3. Hot work (e.g. welding, torch cutting).
 4. Pesticide application
 5. Temporary Food Services Permit
 6. Operations involving experimental high energy systems (large electric current, high magnetic field, high pressure gas, high voltage).
 7. Operation of equipment capable of generating significant levels of hazardous radiation.
 8. Activities involving the use of radioactive materials.
 9. Activities involving the use of explosive materials.
 10. Activities involving the use of carcinogens, suspect carcinogens, etiologic materials.

11. Any activity where implementation of the controls specified by a code or standard is not sufficient to reduce the risk to an acceptable level or which activity is not in compliance with codes or standards.

12. Whenever required by University management or by HSEO

- Department Heads and Office Directors or designates are required to conduct investigations of accidents and incidents and complete written Accident/Incident Report form to be filed with HSEO.
- Safe work by contractors is to be ensured through process of selection, bid and contract documents and project monitoring.

CHAPTER 3 Emergency Procedures

- Know emergency priorities:
 1. Personnel safety - yours and others.
 2. Protect university property.
 3. Preserve academic programs.
- Know emergency procedures including location of emergency exits and evacuation routes.
- Complete any specific training applicable to your work environment and/or job responsibilities especially as they relate to emergency response and procedures.

CHAPTER 4 Training and Education

- All employees and students are to be provided with the training necessary to carry out potentially hazardous operations and tasks in a manner which prevents injury and disease in themselves and others as well as preventing property damage.
- The following training courses are required for persons engaged in the type of activity indicated by the course:
 - Laboratory Workers:
 - Biological Safety
 - Respiratory Protection
 - Electrical Safety
 - Pressure Safety
 - Radiation Safety with Unsealed Radioactive Materials
 - Radiation Safety with Sealed Radioactive Materials and Irradiating Apparatus
 - Safety with Non-ionizing Radiation
 - Laser Safety (Class 3 and 4)
 - Chemical Safety in the Laboratory
 - Hazardous Waste Management
 - Operational Staff:
 - Respiratory Protection
 - Chemical Safety for Operational Staff
 - Electrical Safety
 - Pressure Safety
 - Confined Space Entry
 - SCBA Training
 - SCBA Refresher

CHAPTER 5 Engineering Safety

- Electrical
 - Compliance with the Code of Practice for the Electricity (Wiring) Regulations.
 - Repairs for electrical equipment to be carried out by qualified electricians only.
 - Only safe and sound electrical equipment in compliance with standards and codes to be used.
 - Written procedures for "lockout-tagout" when work with high-voltage sources including capacitors.
- Workshops
 - All equipment moving parts properly guarded.
 - Interlocks and safety zones for non-guardable moving parts (e.g. robotics) .
 - Specific training on use of equipment.
- Material Handling
 - Proper training in materials handling, both manual and equipment assisted.
 - Safe and sound equipment for lifting and materials handling.
- Working at Heights
 - Sound working platforms, equipment and scaffolds in compliance with Government regulations and codes such as the Code-of-Practice for Scaffolding Safety and the Factories and Industrial Undertakings (Suspended Working Platforms) Regulations, Construction Sites (Safety) Regulations.

- Training in the proper procedures for working at heights and in the proper use of safety related equipment such as safety belts, harnesses and lifelines.
- Provision of sound safety equipment for working at heights.
- Tools
 - Proper training in the safe use of power tools including required safety equipment such as safety glasses.
 - Provision of safe and sound power tools.
- Welding and Cutting
 - Hot Work Permits required for welding and cutting operations.
 - Training in the safe use of welding and cutting equipment, including hazards associated with the hot work itself such as electrical hazards in the case of electric-arc welding, hazards associated with compressed gas cylinders in the case of gas welding. Training shall also cover proper use of required safety equipment such as eyewear and respirators.
 - Provision of safe and sound equipment.
 - Compliance with applicable legislation, including the Dangerous Goods Ordinance, Electricity Ordinance and Hong Kong Factories and Industrial Undertakings Regulations.
- Pressure Systems
 - Training in the proper operation of pressure system.
 - Safe and sound equipment.
 - Pressure regulators and other equipment to be compatible with any hazardous materials (e.g. gases) in the system.

- Compliance with Hong Kong Government regulations and codes-of-practice including the Labour Department Boilers and Pressure Vessels Ordinance and the Fire Services Department Dangerous Goods Ordinance as it relates to compressed gases (Category 2 Dangerous Goods).
- Pressure systems shielding as needed.
- Confined Spaces
 - Confined Spaces Safe Entry Permit (CSSEP) required for working in hazardous confined spaces.
 - Training required for working in confined spaces.
 - Proper personal protective equipment required for working in confined space.
 - Monitoring of atmospheric condition in confined space including the presence of hazardous airborne contaminants, toxic gases and safe oxygen content (not too much or too little).
 - Emergency rescue equipment in good working order and readily available during hazardous confined space entry work.
 - Working knowledge of confined space emergency procedures.

CHAPTER 6 Fire Safety

- Employees and students must perform their work in a way that minimizes the possibility of causing a fire and avoids the enhancement of fire spread.
- They must follow instructions given by their supervisors and the DSO concerning fire safety.
- Employees and students must learn proper procedures for handling flammable materials and receive training in the appropriate response in the event of fire.
- They should know fire exits and evacuation routes in advance.
- They should know how to use a fire extinguisher and what type to use in the event of a fire.
- Hot Work Permit is required for certain activities including electric arc welding, gas welding and cutting, lighting of fires or any other activities which could result in the deliberate introduction of an ignition source into the work area.
- Supervisors should perform routine inspection of work areas for fire hazards.
- Employees and students should participate in fire drills for the Academic Building and/or student residences.

CHAPTER 7 General Laboratory Safety

- Complete appropriate HSEO safety training course(s).
- Obtain and be familiar with equipment manuals and operating instructions.
- Obtain and be familiar with Material Safety Data Sheets (MSDS) as appropriate.
- Be conversant in operating specific Operational Safety Procedures.
- Conduct all operations involving hazardous materials using appropriate safety equipment such as fume cupboards and personal protective equipment (PPE).
- Participate in HSEO personal exposure monitoring program.
- Participate in HSEO hazardous waste management program.
- Comply with Hong Kong Government regulations including:
 - Factories and Industrial Undertakings (Dangerous Substances) Regulations,
 - Waste Disposal (Chemical Waste) (General) Regulations and
 - FSD Dangerous Goods Ordinance, Cap. 295.
- Know emergency procedures including locations of nearest fire exits and evacuations routes.

CHAPTER 8 Chemical Safety

- Complete HSEO Chemical Safety for Laboratory Users or Chemical Safety for Operational Staff courses as appropriate.
- Obtain and be familiar with Material Safety Data Sheets (MSDS).
- Conduct all operations involving hazardous materials using appropriate safety equipment such as fume cupboards and personal protective equipment (PPE) as necessary.
- Participate in HSEO personal exposure monitoring program.
- Participate in HSEO hazardous waste management program.
- Be conversant in operating specific Operational Safety Procedures (OSP).
- Comply with Hong Kong Government regulations including:
 - Factories and Industrial Undertakings (Dangerous Substances) Regulations including Occupational Exposure Limits, TLVs, etc.,
 - EPD Waste Disposal (Chemical Waste)(General) Regulations and
 - FSD Dangerous Goods Ordinance, Cap. 295.
- Know emergency procedures including locations of fire exits and evacuation routes.

CHAPTER 9 Biological Safety

- Complete HSEO Biological Safety course.
- Obtain and be familiar with Material Safety Data Sheets (MSDS).
- Conduct all operations involving hazardous materials using appropriate safety equipment such as biosafety cabinets and personal protective equipment (PPE) such as respirators and gloves.
- Participate in HSEO personal exposure monitoring program as appropriate.
- Participate in HSEO biohazardous waste management program.
- Be conversant with lab specific Operational Safety Procedures (OSP) including knowledge of biosafety level and corresponding control measures according to the CDC/NIH guidelines.
- Participate in HSEO serum banking and immunoprophylaxis program as necessary.
- Know emergency procedures including locations of nearest fire exits and evacuation routes.

CHAPTER 10 Radiation Safety

- Obtain Radiation User Authorization (RUA) from HSEO.
- Complete appropriate HSEO radiation safety course(s).
- Participate in HSEO radiation exposure dosimetry program.
- Participate in HSEO facility contamination survey program.
- Participate in HSEO radiation waste management program.
- Establish policies and procedures commensurate with the hazards of the operation.
- Comply with Hong Kong Government regulations including:
 - Radiation Ordinance, Cap 303
 - Radiation (Control of Radioactive Substances) Regulations and
 - Radiation (Control of Irradiating Apparatus) Regulations.
- Report any new outdoor and indoor antenna installation to HSEO.
- Know emergency procedures including locations of nearest fire exits and evacuation routes.

CHAPTER 11 Laser Safety (Class 3 and 4)

- Have written and approved Operational Safety Procedure (OSP) and Laser Hazard Control Plan on file with HSEO.
- Complete HSEO Laser Safety training course.
- Register equipment and users with HSEO.
- Attend pre-work eye examination as well as eye examinations following confirmed or suspected exposure and at termination of employment or tenure at HKUST.
- Comply with Hong Kong Government regulations including:
 - Electrical and Mechanical Services Department Code-of-Practice for Lasers and the most recent ANSI Standard of Safe Use of Lasers,
 - Factories and Industrial Undertakings (Dangerous Substances) Regulations including Occupational Exposure Limits, TLVs, etc.,
 - EPD Waste Disposal (Chemical Waste) (General) Regulations and
 - FSD Dangerous Goods Ordinance, Cap 295.
- Know emergency procedures including locations of nearest fire exits and evacuation routes.

CHAPTER 12 Occupational Health and Medical Surveillance

- Biohazard Workers
 - Minimal surveillance to include a review of medical records, periodic examination of employees' health and review of work activities.
 - Participation in immunoprophylaxis and/or serum banking program as necessary.
 - Personnel being treated with immunosuppressive drugs to be excluded from biohazard work during the treatment period with physician's release prior to returning to biohazard work.
- Respirator Users
 - Annual medical clearance including lung function testing.
 - SCBA users also need urinalysis and may also require to have additional tests as needed.
- Laser Users (Class 3 and 4)
 - Pre-work eye examination.
 - Eye examination after any suspected or confirmed exposure to the laser beam.
 - Eye examination at termination of employment or tenure at HKUST.
- Hazardous Chemicals Users
 - Personal exposure monitoring to airborne hazardous contaminants.
 - Biological monitoring of suspected overexposure for comparison against biological exposure indices (BEI).

- Radiation Users
 - Radiation user examination.
- Noisy Equipment Operators
 - Compliance with Factories and Industrial Undertakings (Noise at Work) Regulation of 85 dBA TWA and 140 dBA peak exposure for impact noise.
 - Persons exposed in excess of the regulation are required to participate in Hearing Conservation Program.
 - Participation in the Hearing Conservation Program including audiometric testing.
- Work Restrictions
 - Temporary restrictions on types of work activities for convalescence or pregnancy.

CHAPTER 13 Personal Protective Equipment

- Eye protection of an approved type to be worn in situations where there are risks of eye injury including
 - hazardous chemicals such as organic solvents, acids and bases,
 - lasers,
 - grinding, torching, chiseling or other activity which can generate particulate projectiles,
 - welding and cutting operations in which intense ultra-violet (UV) and infra-red (IR) radiations are emitted.
- Body protection of an approved type to be worn in situations where there are risks of bodily injury from pressure systems, hazardous chemicals, rolling or falling heavy objects. Body protection includes hard hats, shoes with capped toes and steel insoles, gloves, etc.
- Respiratory protection of an approved type to be worn in situations where the level of airborne hazardous contaminants cannot be kept below the occupational exposure limits or to an expected safe level where no OEL has been established.
- Hearing protection of an appropriate type to be worn where exposures to noise exceed the Factories and Industrial Undertakings (Noise at Work) Regulations of 85 dBA for 8 hours or 140 dBA peak exposure to impact noise.
- Fall protection of an appropriate type to be used when working at heights.

CHAPTER 14 Office Safety

- Office equipment to be situated according to manufacturer's instructions (e.g. copy equipment in a well ventilated area).
- Disposal of spent cartridges, toner, etc., according to proper procedures (e.g. recycling or hazardous waste disposal as indicated by manufacturer's instructions and Government regulations).
- Training in fire safety and emergency response procedures including exits and evacuation routes.
- Training in safe use of office equipment including the hazards and controls for repetitive stress injuries.

***CHAPTER 15* Traffic Safety**

- All vehicles on campus to be currently registered and insured.
- All vehicles on campus to be operated in a safe manner and in compliance with traffic signs (e.g. speed limits).
- Driver must possess valid driving license.

CHAPTER 16 Hazardous Waste Management

- Comply with HKUST policies and guidelines concerning hazardous waste.
- Comply with Hong Kong Government environmental regulations, in particular:
 - Waste Disposal (Chemical Waste)(General) Regulations and
 - Water Pollution Control Ordinance.
- Participate in HSEO hazardous waste management program.
- Complete HSEO Hazardous Waste Management course.
- Know emergency response procedures including locations of nearest fire exits and evacuation routes.

CHAPTER 17 Waste Minimization

- Do your part to minimize waste and recycle.
- Comply with HKUST policies and guidelines concerning liquid and air effluent.
- Comply with Hong Kong Government environmental regulations including
 - Waste Disposal (Chemical Waste) (General) Regulations,
 - Water Pollution Control Ordinance, Cap 358, S21,
 - Air Pollution Control Ordinance, Cap 311,
 - Montreal Protocol (ozone depleting substances) and
 - 1992 Earth Summit (greenhouse gases).
- Participate in HSEO hazardous waste management program if applicable.
- Complete HSEO Hazardous Waste Management course if applicable.
- Participate in Chemical Exchange Program (CEP) if applicable.

CHAPTER 18 Resource Conservation

- Do your part to conserve resources (e.g. save energy, water, etc.).
- Plan and purchase with resource conservation in mind.
- Comply with HKUST policies and guidelines concerning resource conservation.

CHAPTER 19 Liquid Effluent

- Comply with HKUST policies and guidelines concerning liquid effluent.
- Comply with Hong Kong Government environmental regulations including
 - Water Pollution Control Ordinance, Cap 358, S21.
- Participate in HSEO hazardous waste management program if applicable.
- Complete HSEO Hazardous Waste Management course if applicable.

CHAPTER 20 Air Emissions

- Comply with HKUST policies and guidelines concerning air emissions.
- Comply with Hong Kong Government environmental regulations and international agreements including
 - Air Pollution Control Ordinance, Cap 311,
 - FSD Dangerous Goods Ordinance, Cap 295 including the Code-of-Practice for Electronic Gases,
 - Montreal Protocol (ozone depleting substances) and
 - 1992 Earth Summit (greenhouse gases).
- Participate in HSEO hazardous waste management program if applicable.
- Complete HSEO Hazardous Waste Management course if applicable.

CHAPTER 21 Nanomaterial and Nanotechnology

- Adopt the concept of responsible nanotechnology. Consider environment, health and safety (EHS) impact of nanomaterial and nanotechnology throughout life cycle of product.
- Take precautionary measures in view of the unknown and uncertainties in EHS of nanomaterials.
- Involve HSEO from planning stage to ensure incorporation of necessary safety installations, procedures and protective equipment.
- Properly declare known or suspected hazards in Committee on Research Practices review form.
- Collaborate with HSEO in compiling information about nano-related research on campus.
- Use HEPA filter for control of airborne nanomaterials.
- Beware of unique hazardous properties of nanomaterials and use precautionary measures in handling of nanomaterials, such as good personal hygiene, avoiding skin contact, using personal protective equipment.
- Treat nanomaterial waste as chemical waste. Seek to remove nanomaterial from waste stream where possible.
- Pay attention to new environment, health and safety knowledge related to nanomaterials and make necessary modification to work process.