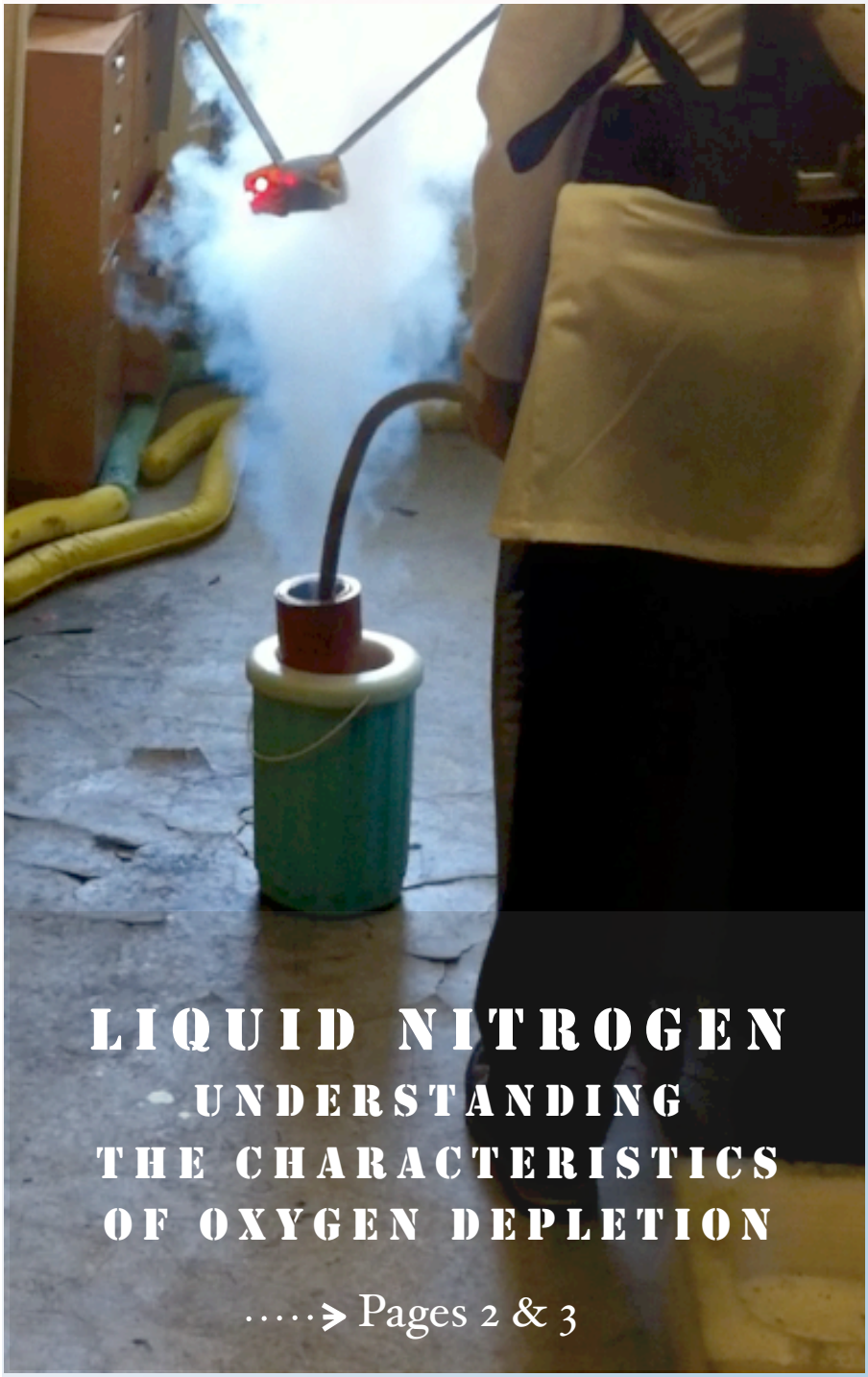
Imperial College London

Health and Safety Matters

June 2012



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Access Health and Safety Matters in electronic format at :
http://www3.imperial.ac.uk/safety/subjects/newsletter

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During February and March, the Safety Department conducted a series of experiments with the purpose of trying to understand the dynamics of oxygen depletion resulting from the release of significant quantities of liquid nitrogen. The Chemistry Department kindly identified and donated a disused room where the experimental work could be undertaken and also provided a liquid nitrogen pressure vessel.

Four experiments have been carried out to date. Aside from an initial tentative effort at releasing a small quantity, each experiment involved releasing close to 100 litres of liquid nitrogen into the room and measuring the oxygen levels with a series of detectors placed at strategic locations. To represent something approaching a worst case scenario, the room did not benefit from any forced ventilation. The first experiment involved discharging the liquid nitrogen into a shallow metal tray – the intention being that it would afford a degree of containment and protection to the floor. However, as we became more cavalier in our outlook, in the remaining three experiments, we discharged the liquid nitrogen directly onto the vinyl floor (progressively destroying it in the process). In the final experiment, heated fans were employed in an attempt to create turbulence and waft the nitrogen to the upper reaches of the room. During all the experiments, a member of the Safety Department was present in the room equipped with full breathing apparatus. The oxygen detectors that were hired had data logging capabilities to enable the experimental results to be evaluated afterwards.

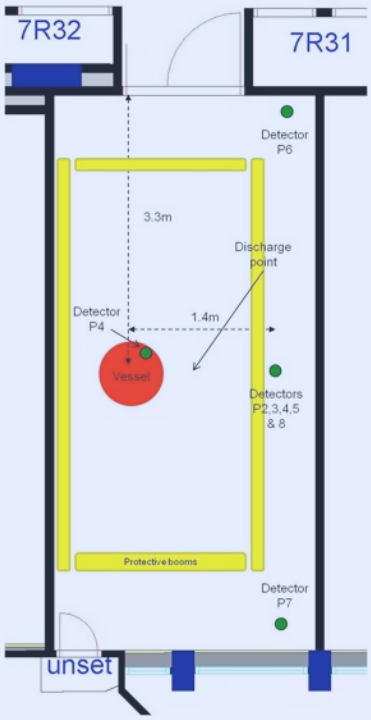
So what did we learn from this series of experiments? The following broad conclusions can be drawn:

- Whilst oxygen levels in the operator's breathing zone (taken as being above 1m in height) went below the 'safe' limit of 18%, they did not reach below 15% in the experiments where there was no deliberate air movement within the room. Only at very low levels close to the floor (~0.1-0.25m) was it possible to reduce oxygen levels to critically low single figures.

- Good reproducibility in results was observed when the same experiment was conducted on different days. However, it remains to be seen as to whether conducting the same experiment in a different room using a different pressure vessel would give rise to a variance in results.

- Where fans were employed, the oxygen levels were generally observed to be lower, but not drastically so. However, it may indicate that, in terms of room design, the presence of recirculating A/C units may be undesirable in the absence of forced extraction.

- Using a well established theoretical calculation (that assumes uniform distribution of gas), oxygen is shown to be depleted from the room by around the 13 minute mark. This is clearly very different to what was observed experimentally.



A schematic of the room where the experiments were undertaken

In summary, the experiments have gone some way to assist in understanding the dynamics of oxygen depletion and thus form a basis for policy decisions going forward. The current series of experi-

ments have drawn to a close, though it remains possible that further work will be carried out in future should the opportunity arise. Academics in the Chemical Engineering department have offered to assist in finding a modelling equation that more accurately reflects how the oxygen depletion process works in practice and that can be more effectively employed in the risk assessment process rather than relying on the calculations advised by British Compressed Gases Association. The College Liquid Nitrogen Code of Practice is currently undergoing review with some further key changes including:

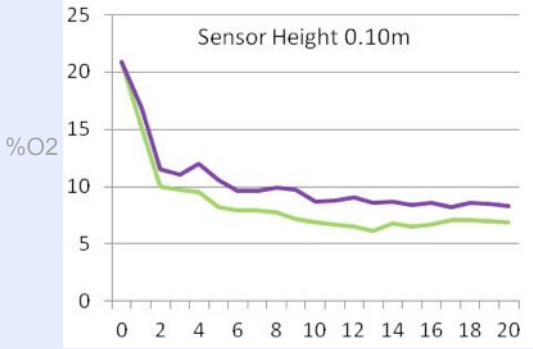
- Establishing the requirements for determining when forced ventilation is needed and ensuring that adequate monitoring and alarms for the ventilation are provided.
- Ensuring that where the risk assessment identifies a need for oxygen depletion monitoring, the monitor, type, location and where they sound will be specified to a College standard.
- Restrictions on lone working with liquid nitrogen. The severity of the restriction will depend upon the nature of the work.
- More precise requirements for the security and maintenance of critical plant and alarms.

A full report on the liquid nitrogen experiments was submitted to Health, Safety and Environment Committee on 23 May. It is the intention that the amended Code of Practice will be submitted at the next meeting of the committee for ratification.

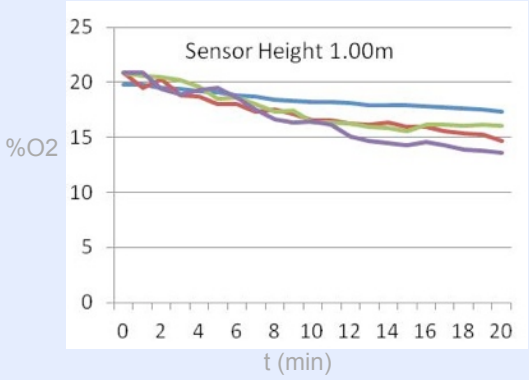
It is envisaged that the amended Code of Practice will include a matrix table that will outline the minimum requirements for the range of common liquid nitrogen scenarios that we typically encounter in the College and that this will provide an 'at-a-glance' summary of what needs to be in place. The next step is to undertake an impact assessment to try to attempt to gauge what will be required to bring the non-compliant facilities up to scratch. As always, further information on the experimental work described here is available from the Safety Department.

A selection of graphs taken from the report on the series of liquid nitrogen experiments showing:

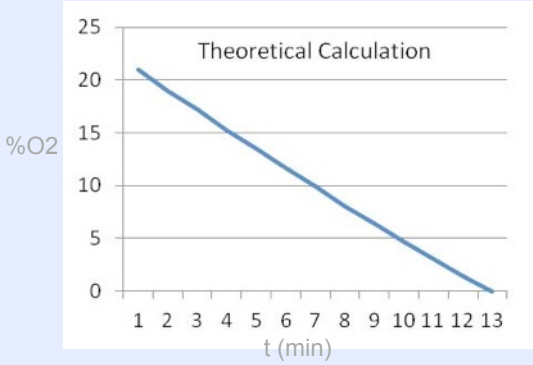
A. Oxygen levels reached at very low height within the room



B. Oxygen levels reached within the operators breathing zone



C. Oxygen level calculated using BCGA calculation (making certain assumptions regarding flow rate)



Ergonomic Advice for Homeworking

Many College employees will already be acquainted with the experience of homeworking. With the Olympics looming, there is an increased likelihood that employees and managers will be turning their minds to home working as an option to help reduce time lost through transport delays and maintain productivity. As improved broadband has enabled more effective access to shared drives through a VPN connection, the psychological and physical hazards of home working should be considered as part of the planning process.

To ensure the working arrangement is as low stress as possible, managers and employees should agree clear guidelines regarding objectives, working hours, management communication and support, peer support, IT support; performance standards and sickness reporting. IT systems should be set up and checked in advance to reduce the need to contact ICT for help on the day. Contingency arrangements should be drawn up in case there are problems.

Environmental suitability: the work area should be appropriate – with access to a chair, desk and a reasonable standard of lighting. The home may not be a suitable work environment if there are lots of distractions - the local library reading room might be more suitable if access to VPN isn't necessary. The the risk of eye strain from using a laptop in the garden during sunny weather should not be underestimated.

For many the workstation will be a laptop positioned on a kitchen table with a dining chair. Taking a little time to set this up may lessen the risk of developing neck and arm pain, as domestic furniture is not designed with work in mind. A cushion or pillow will raise the height of the seat so your arms will be in a better position to allow you type more comfortably.

If you use a laptop, a stand (pictured above) may help you achieve a better monitor height. These are affordable at less than £10 - however you will need to use a separate keyboard and standard size mouse. Further laptop guidance may be located on the Occupational Health Service web pages: http://www3.imperial.ac.uk/occhealth/guidanceandadvice/computerhealth/laptophealth

Home working is often considered as a good opportunity to work uninterrupted on a difficult project or task. It is important, as always, to take regular breaks by using a program such as *Workrave* for PC/linux: http://www.workrave.org/ or *Dejal Timeout* for Mac www.dejal.com/timeout/ .

These programs need to be configured to ensure the optimum balance between breaks and work. If you are working at your kitchen table, getting up and stretching at least every hour will prove beneficial.

If home working is planned as a long term arrangement, a routine Display Screen Equipment self assessment should be carried out: http://www3.imperial.ac.uk/occhealth/guidanceandadvice/computerhealth

The OH Service in conjuction with other HR sections and and Sport Imperial are developing proposals for a mental health and wellbeing strategy for the College. Objectives are to:

STRATEGY

- prevent work induced mental health problems.
- positively promote lifestyle choices and behaviours in work that can improve health and wellbeing.
- ensure that staff with mental health conditions affecting them in their work can feel able to disclose these and be provided with support to enable them to succeed in their work.

It is envisaged that objectives will be largely achieved through awareness campaigns, inclusion of the topic in existing management & leadership training programmes and promoting better use of existing policies and procedures rather than the introduction of new policy.

News Snippets

Safety, Health and Radiation Users Group (SHRUG)

SHRUG has now been running for many years and was originally conceived as a forum for communication with people with safety responsibilities within their departments and a means for the continuing professional development of NEBOSH Certificate holders. However, things have changed considerably within the College as the years have passed. Faculties and facilities now employ full time professional safety managers with whom the Safety Department communicate on a daily basis and these individuals act as the conduit between ourselves and the departments and their departmental or section safety advisers. As a result, the need for a forum such as SHRUG in its existing format has diminished.

In consultation with Faculty and Campus Safety Managers, it has been concluded that SHRUG will metamorphose into a forum whereby the Safety Department, Occupational Health and FSMs and CSMs can present and discuss specific health and safety issues, the results of which can be fed back to departments via the FSMs and CSMs. The first of the new style forums is scheduled to take place on 27th. June. The subject material will be 'Lone Working' and representatives from the Faculties, Facilities and Security will be given the opportunity to contribute to the presentations and resultant discussion.

It has also been decided that SHRUG should be replaced with a new name, though no decisions have yet been made with regard to this.

*i*Check

By the time that this edition of *Health and Safety Matters* has been published, the latest *i*Check question set should have been distributed to departments. The subject of the latest audit is accident and incident management.

Asbestos and Fume Cupboard Audit

Two concurrent safety audits are to be taking place throughout June - one on the College's Asbestos Management Plan and the second on the College's Fume Cupboard Code of Practice. It is anticipated that the audit reports will be presented to the College Health, Safety and Environment Committee later in the year. Some site visits will be involved but the audit will otherwise mainly involve interviews.

A CHASE Notice (College Health and Safety Essentials) was circulated to relevant staff on 25th May. The notice can also be found on the Safety Department website at:
http://www3.imperial.ac.uk/safety/subjects/hodinfo

HSE Intervention Fees

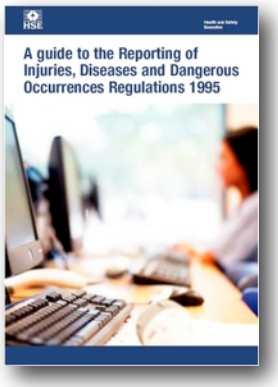
The HSE, as from later in the year, will be introducing a scheme under which they will levy a charge for an inspector's time, if during the course of a visit, they identify a breach of the law that requires them to intervene either by sending a letter or serving enforcement notices. The inspectors time will be charged at £124 per hour and the charges will apply for all the time the inspector has been on site and for the office time that it takes for the inspector to write the letter and prepare the notices. The College has yet to determine the best means of providing the funding to cover such charges.

The College was reminded of the above proposal following a HSE inspection of cooling towers at the South Kensington campus. This formed part of the HSE programme of inspections to address the risk of *legionella* presented by cooling towers in central London locations and those located close to Olympic venues outside London in advance of the Games next month. The College procedures were found to be exemplary and well ahead of industry norms, though some non-related issues were identified with regard to inadequate roof edge protection. These matters are currently being addressed.

Health and Safety Matters - Frequency of Publication

It has been decided that *Health and Safety Matters* will in future be published twice yearly as opposed to the quarterly publication that has been in place since June 2005. The publication dates will be in June and December of each year. Unfortunately, due to other work pressures it has become increasingly difficult to sustain an eight page quarterly production and meet the publication deadlines. We hope that by reducing the frequency of publication, we can maintain the quality of the newsletter and continue to produce something that we have always seen as a means of communicating health and safety information in a more informal way than the other recognised modes of communication.

Accidents, Incidents, Occupational Ill Health etc.



RIDDOR changes take effect

In the March 2011 edition of *Health and Safety Matters*, we reported on the launch of the HSE consultation on the *Reporting of Injuries, Diseases and Dangerous Occurrences Regulations* (RIDDOR) with regard to the proposal for changing the requirement for reporting over-three-day absence accidents to over seven days. This has now come to pass and took effect on 6 April. In addition, employers now have a 15 day notification period to report incidents to the HSE rather than 10 days as was previously the case. Historically, the College has only reported a small number of over-three-day injuries each year (the most common RIDDOR usually involves students being taken to hospital) and now that the threshold has been extended, these are likely to become uncommon.

Updated RIDDOR guidance is free to download from the HSE website:http://www.hse.gov.uk/pubns/indg453.htm

Universities Safety & Health Association Accident Stats

At the end of January, the College submitted its annual accident return to USHA for collation with the statistics from other UK universities. The full range of data is available from the Safety Department. The table below compares the College accident rates with the average figure for all universities.

	Staff		Students	
	Accident rate per 1000 at risk (RIDDOR)	Accident rate per 1000 at risk (Total)	Accident rate per 1000 at risk (RIDDOR)	Accident rate per 1000 at risk (Total)
Imperial College London	0.6	19.00	1.1	7.7
Average	2.00	29.00	0.26	3.55

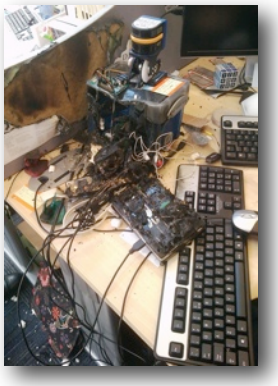
Salus Update

It is now nearly eight months since *Salus* was launched and we have well over 500 reports logged within the system. We remain disappointed that the teething problems that we have encountered have been more extensive than we had hoped or anticipated and we have expressed our dissatisfaction to the system suppliers as a result and we expect a degree of recompense. However, by the time that this edition of *Health & Safety Matters* is published, another upgrade to the system should have taken effect. This should rectify the bugs that have been evident to date and will include an additional function whereby we can 'allocate' individual incidents to enable staff who do not have blanket access to the incident management functions to enable them to be able to view and edit the report. This should prove useful particularly in instances where incidents involve something that relates to the condition of the premises and we can enable the Building Manager for the area to access the report. In the longer term we also hope to improve the options for producing summary reports.

Beware fiery tablet computers.....

On 3 May, a fire occurred on a desktop in the Huxley Building that was caused by an overheating tablet computer (Gigabyte U60 UMPC, purchased 2007). The item ignited whist undergoing recharging and the resultant fire required the use of three extinguishers, though the damage was limited to the immediate area.

ICT were unable to find any similar reports elsewhere concerning this particular model and no recall notices appear to have been issued by the manufacturers. The item does not appear to have been purchased through the normal College suppliers. If anyone knows of the existence of other examples of this computer elsewhere in the College, then they are advised to contact ICT or the Safety Department.



FREQUENTLY ASKED QUESTION
FAQ

How much flammable solvent am I allowed to keep in my laboratory?

The physical risks presented by flammable liquids are covered by the *Dangerous Substances and Explosive Atmospheres Regulations 2002*. Paragraph 39 of the Approved Code of Practice to these regulations (L135) states:

Only the minimum amount of dangerous substances needed to carry out the work activity should be kept in process areas, workrooms, laboratories and similar working areas. Material that is not in use should be returned to the designated storage area. Small quantities of flammable liquids in closed containers can be stored within the workroom in a suitably placed cupboard or bin which is of fire resisting structure and is designed to retain spills.

The following paragraph (40) in the supporting guidance section clarifies matters a little more:

For flammable liquids that have a flashpoint above the maximum ambient temperature (normally taken as 32°C), this small quantity that may be stored in the workroom is considered to be an amount up to 250 litres. For extremely and highly flammable liquids and those flammable liquids with a flashpoint below the maximum ambient temperature the small quantity is considered to be up to 50 litres.

Short of referring to individual labels and material safety data sheets, it can be difficult to easily distinguish between degrees of flammability and differences in flashpoints for the purposes of day to day visual inspections and control. The College stance has always been to take the lower value (50 litres) as the general benchmark.

Further information:

Storage of Dangerous Substances: L135 http://www.hse.gov.uk/pubns/books/l135.htm

The Storage of Flammable Liquids in Containers; HSG51 http://www.hse.gov.uk/pubns/books/hsg51.htm

Safe Use and Handling of Flammable Liquids HSG140 http://www.hse.gov.uk/pubns/books/hsg140.htm

Disclosing medical vulnerabilities

Some while back, a discussion took place during one of the College Biosafety Forums as to how to approach the issue of determining whether students had any conditions that may impact upon their safety without breaching medical confidentiality. As a result, Occupational Health are able to offer the following key points:

For general student inductions

- Students should be advised that if they have any health condition or are taking treatment that could cause them to lose consciousness, affect their alertness or for which they might require emergency assistance, they should let their senior tutor or supervisor know so that they can be in a position to organise help should it be required and ensure appropriate precautions are put in place if necessary to ensure the student's safety.
- For health conditions which might require emergency help it is also worth the student letting a couple of friends know as well, so they can know what to do if help is needed away from the Department.
- All students should register with a doctor in London as soon as possible. This is particularly important if the person has any health problems that require regular treatment. All students living in central London Halls can and should register with the College Health Centre. Students living outside halls may also be able to register. Check the Health Centre website for information: www.imperialcollegehealthcentre.co.uk.

For H&S inductions for hazardous work

Students (& new staff) should be asked as part of their induction:

- Whether they have any health condition or disability which causes:
  - loss of consciousness or blackouts.
  - disabling attacks of giddiness or loss of balance.
  - restriction of vision or hearing.
  - limitations to manual dexterity.

Disclosing medical vulnerabilities (continued from previous page....)

- Whether they are taking any medicines that can cause drowsiness.
- Where fieldwork is being undertaken - whether they have any medical condition for which emergency treatment may be required.

If any questions are answered yes, then they should be asked for information on what happens, how they manage with the condition and what help do they think they might need.The person should not be pressured to disclose the specific health problem they have: it is the nature of impairment the supervisor/ tutor needs to know about. If the student is uncertain on whether or not they need to disclose, they should be advised to consult their doctor. If a supervisor/ tutor is uncertain over what (& whether) precautions are needed they can seek advice from Occupational Health by phone or e-mail in the first instance. Most times OH will probably not need to see the student, though will arrange to do so, if necessary.

Safety Training

The Learning and Development Centre is currently organising the 2012/ 13 programme and we hope to update the safety training webpage with the bulk of the classes by mid August 2012. We will notify Safety Officers and First Aid Co-ordinators when the programme is ready: http://www3.imperial.ac.uk/staffdevelopment/safety/index.

We are actively looking at not charging for internal safety training classes with the exception of NEBOSH National General Certificate, Bio-safety Practitioners Award and Gas Safety courses. Of course this will depend on our level of funding for 2012/ 13 and our ability to generate income from external sources.

Our Gas Safety course will combine both E Learning and classroom contact. We will further introduce E Learning Gas Safety Refresher for delegates whose qualification is more that 2/ 3 years old from September 2012. We are also looking at Working at Height seminar led by Safesite Limited who deliver our Ladder and Step Safety training at the College. The seminar is aimed at anyone who is responsible for work being carried out on/in a premises, as well as for those who are actually working at height. This includes, although not limited to: Project Managers, Maintenance Managers and teams, Caretakers, Contractors/ Sub-Contractors. This seminar can also be part of CPD and an opportunity to discuss any queries or concerns. We are looking at ending the 1 day Personal Fieldwork First Aid course and instead concentrate our resources on the 2 day Fieldwork First Aid where there is greater demand. Furthermore, we are also looking at introducing a 2 hour DSEAR lecture which we observed at a recent IOSH meeting which was informative, lively and raised participants awareness and perception of hazardous materials. We will consult relevant parties about these new events in the summer.

Finally, we're looking to appoint a Learning Technologist Coordinator (LTC) who we hope will be in place at the beginning of September 2012 to help us design and deliver E. Learning as part of a wider role within the Learning Development Centre. Interviews have taken place as we go to press. The role will entail bringing together various individuals with specialist information who can help us progress to the next phase of developing learning content. The LTC will help with safety training and we hope to make a start with the foundation courses like Principles of Radiation Protection and X Ray Safety Awareness. We also hope that the LTC will be able to transfer knowledge and skills to colleagues and implement a recognisable identity and standard format. There are technological concerns about ease of access and interface with the Oracle Learning Management System. We expect multiple demands for E. Learning content but these expectations will have to be managed.

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