

CTBT - an update

The 16th Meeting of the Working Group for the implementation of the International Monitoring System for the Comprehensive Nuclear Test Ban Treaty (CTBT) was held in Vienna during September, and was attended by Jim Turnbull, Group Manager, NRL.

Of potential significance to New Zealand, and NRL, was approval within the 2001/2002 CTBT working budget for initial radionuclide site surveys at Fiji and Kiribati to be carried out. Proposals for this work have now been submitted by NRL and if successful the surveys will be undertaken early in 2002. Actual station construction will likely commence within 2002/03. These stations will add to those currently operated by NRL at Chatham Island, Rarotonga and Kaitaia.

Further progress was also made on a number of other issues including quality control procedures within certified radionuclide laboratories. NRL is one of 16 such laboratories named in the Treaty, and expects to be certified as an ISO 17025 facility in 2002. The CTBT organisation has recently requested that NRL submit proposals for the development of specialised software for managing laboratory quality control functions. NRL has already developed proprietary station operating software and will shortly provide help-desk support to other station operators under contract to the CTBT organisation in Vienna.

Risk assessment and contingency planning for terrorism

In light of recent events worldwide concern has grown regarding the potential threat of terrorist acts involving the use of radioactive materials.

The Ministries of Foreign Affairs and Trade and Health are carrying out contingency planning to deal with terrorist activities including biological, chemical and radiological threats. As part of this work NRL has carried out a risk assessment that considers a number of terrorist scenarios involving radioactive material in New Zealand.

The scenarios include theft or misappropriation of radioactive sources from facilities or during transport, attacks or arson on sites storing significant quantities of radioactive material and posting or delivering radioactive

contaminated material. The detonation of "dirty bombs" is also considered. These are bombs made with conventional explosives combined with radioactive material.

The risk assessment identifies emergency response arrangements and various control measures that can reduce the likelihood of any of these events occurring in New Zealand. Of particular importance is the need to ensure security of radioactive sources at all times in use and in storage. This is a licensee responsibility and in the current climate NRL strongly recommends that licensees review and where necessary enhance security arrangements. This is an area NRL will focus on during future compliance monitoring visits.

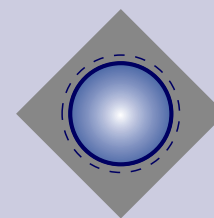
IAEA Regional Cooperative Meeting (Asia and Pacific)

Representatives of the 17 member states from the region, including Jim Turnbull, Group Manager of NRL, met during September at the International Atomic Energy Agency headquarters in Vienna.

An agreed high priority endeavour for the regional members is to work towards strengthening regulatory frameworks for radiation protection, especially in developing countries. A number of member states still have only rudimentary controls relating to radiation sources and the IAEA is supporting and working closely with a number of states to develop and implement radiation safety infrastructure programmes. NRL is presently funded by the IAEA to participate in regulatory support programmes in Thailand, Philippines and Indonesia.



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We wish all of our readers a happy and safe Christmas and New Year and hope you are looking forward to an enjoyable and successful 2002.

Electric and magnetic fields and your health

Since 1989 NRL has published a booklet to provide information about electric and magnetic fields around power lines and other electrical equipment. A new edition has recently been published. Major changes from earlier editions include a larger *Frequently Asked Questions* section as well as summaries of conclusions from the most recent reviews of the research. Conclusions remain the same - it is not clear whether long-term exposures pose any health risks, but if they do, the risks must be very small.

The booklet is available in pdf form on the web site - or for a free paper copy contact enquiry@nrl.moh.govt.nz

Disposal of old smoke alarms: Australia reviews options

Some Australian states have continued to restrict the disposal of old domestic smoke alarms, because of the small radioactive source (up to 40 kilobecquerels of americium-241) that most of them contain. The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) has recently issued a statement questioning the need for this, and recommending that smoke alarms should be disposed of with household waste. This is consistent with NRL's recommendation in New Zealand.

Some Australian manufactured smoke alarms have been marketed in New Zealand, and some of these carry a marking requiring "return to the State Department of Health" or the manufacturer, for disposal. The confusion this has caused in New Zealand would be removed if the marking were discontinued.

Smoke alarms dispersed in waste landfill sites add very little to the environmental level of radioactivity. New Zealand soils contain, on average, naturally occurring alpha emitting radioactive material equivalent to about thirteen smoke alarms per cubic metre. The random dispersal of smoke alarms in landfill sites would not be expected to add significantly to existing levels.

An NRL information sheet, *IS8 Domestic smoke alarms*, contains information on health risks as well as disposal. It is available on the web site or from NRL.

Meeting of Interagency Committee on Extremely Low Frequency and Radiofrequency Fields

The first meeting of the expanded Interagency Committee on Extremely Low Frequency and Radiofrequency Fields was held in October. This Committee, which includes representatives from government, research institutions and industry, was originally set up to advise government on the possible health effects of exposures to the electric and magnetic fields around power lines and other electrical equipment. The terms of reference were expanded early this year to include radiofrequency fields as well.

Membership of the Committee was increased to bring in additional representatives with the necessary expertise to assess research in this area.

The Committee reports to the Director-General of Health, and is required to notify Ministers if there is a reasonable suspicion of health hazards or other issues of significance. Conclusions from the most recent meeting were that there was no need to change the current recommendations to follow exposure guidelines published by the International Commission on Non-Ionizing Radiation Protection (and adopted in the New Zealand radiofrequency field exposure Standard NZS 2772.1), and encourage operators to take low or no cost measures to reduce exposures where possible.

For more information contact Martin Gledhill (Martin_Gledhill@nrl.moh.govt.nz) or the Committee secretary, Sally Gilbert (sally_gilbert@moh.govt.nz, 04 496 2256).

Dental drill: image quality versus patient dose

The last 3 articles of Dental Drill have discussed in depth the issue of patient dose. However, patient dose cannot be considered in isolation from image quality – the whole purpose of the irradiation is to obtain a diagnostically useful image. A very low dose is pointless if the image quality is inadequate. Conversely, using unnecessarily high doses to produce adequate image quality is also unacceptable. And to confuse the issue further, surveys of dental practices throughout the world show that there is little correlation between the image quality produced and the dose actually used.

There are a large number of factors that influence both the image quality and the dose to the patient. This and future articles will discuss some of these factors.

Processing of dental x-ray films

In conventional dental radiography, film processing is arguably the most important factor in ensuring adequate image quality for an acceptable patient dose. Inadequate or incorrect film processing always compromises the diagnostic information. It also impacts on radiation protection, either by the need for repeat exposures (because the films were not diagnostically useful) or by the need to use greater x-ray exposures in an attempt to compensate for the processing deficiencies.

Either automatic or manual processing can be used for dental x-ray films. Both will yield very good films if performed correctly.

The importance of good chemistry...

The developer and fixer must be mixed correctly (following very carefully the manufacturer's instructions and avoiding cross-contamination). Replenishment (either manual or automatic) must be according to the manufacturer's specifications. Replacement of the chemicals must occur at the correct intervals (again as specified by the manufacturer).

Using exhausted chemicals severely limits the contrast available on film as well as typically resulting in more radiation being used as the dentist struggles to produce an image.

The darkroom

The darkroom in which the processing takes place must be light-tight, have an appropriate safelight, be well-ventilated and clean. Desktop processing units similarly need to be light-tight and clean.

Quality assurance

Film processing should be included in the quality assurance programme of every dental practice. In particular there should be standard procedures covering:

- how the chemicals are to be mixed and when they are to be changed;
- the way in which the intraoral and/or extraoral films are to be processed (including times and temperatures);
- replenishment of chemicals;
- routine maintenance and verification of cycling times for automatic processors;
- periodic tests for the darkroom.

For more information contact John Le Heron (John_Le_Heron@nrl.moh.govt.nz)

...and of consistent processing conditions

Processing of films (of a given type) should be consistent and this can only be achieved if time-temperature development is adhered to. For automatic processors this occurs provided the developer is maintained at the appropriate temperature for its developer cycle time. It cannot be overemphasised that automatic processors must have sufficient warm-up time before use. In the case of manual processing the temperature of the developer must be measured (not with a mercury thermometer) and the correct time then determined from the manufacturer's time-temperature chart for the type of film being developed. Processing for a shorter time than is specified for a given temperature will result in lower film densities which will very likely lead to an increased radiation dose in an attempt to increase densities.

A new look for the web site: www.nrl.moh.govt.nz

It is just on four years since the NRL web site was first launched and its popularity has steadily increased over that time, to more than 1000 user sessions a month currently. The site has recently been revamped to mirror the major changes that have taken place within NRL and also to include more information. Accessibility to information for our clients remains paramount and to assist with this a new type of menu is provided. We have also improved the design of the site. The site offers the following main menu options:

Legislation & Licensing • FAQs & Advice • Services & Products • Publications • About NRL

By placing the cursor over one of 5 items above, a menu of options is created which shows the type of information that can be found at any point.

Content changes

There is much more information than was previously available. This is particularly true of the Legislation & Licensing and Services & Products pages. Specific information of interest to licensees now includes how to apply for a licence, renewals, fees, licence categories and compliance monitoring.

Similarly there is now specific information on the following services available: calibration services, environmental analytical services for drinking water, soils and sediments, wipe tests, and certification of radioactivity levels in foodstuffs.

As well as these there is a Search function and a What's New page. We welcome any feedback both about the look of the site and the accessibility of information on it.

Forthcoming changes to non-medical licensing criteria

The *Radiation Protection Act 1965*, under which licences to use ionising radiation sources are issued, covers the majority of medical licensing qualification issues through vocational training and/or registration. While this greatly assists in determining suitability criteria for medical applicants, the same clarity of qualification is not present for non-medical uses.

Since the Act was introduced, there have been many changes to industrial and research practices involving both sealed and unsealed sources. Similarly, the structures of organisations, especially Universities and Crown Research Institutes, have changed markedly.

In order to consider some of these issues, a specialist committee was established under the oversight of the Radiation Protection Advisory Council (RPAC). This committee was chaired by Dr Peter Englert, Dean of Science at Victoria University, and also comprised industry and NRL representatives. Their recommendations were provided to the RPAC earlier this year, and subsequently approved at a Council meeting along with a recommendation to NRL that they be implemented as soon as practicable.

The recommendations will have significant implications for many non-medical users of radiation sources as well as for NRL with respect to implementation.

Major implications include:

- a requirement that establishments develop annual radiation safety plans
- refinement of the concept of user establishments within larger organisations (a University for example will likely comprise several establishments)
- more appropriate licensing of actual users
- clear identification of users operating under supervision or instructions
- stricter competency requirements for any type of use
- requirements for on-going competency assessment
- an agreed audit cycle based upon establishment risk

In association with the Institute of Geological and Nuclear Sciences, NRL has recently conducted a successful pilot programme in order to assess the practical implications of the recommendations. NRL intends to introduce the recommendations more widely early in 2002.

Preliminary discussions have also been held with various university departments and it is pleasing to observe that a number of these are already moving in a similar direction independently of NRL initiatives.

Individuals or organisations who think they are likely to be affected by these policy changes can obtain more information from Jim Turnbull, NRL Group Manager (Jim_Turnbull@nrl.moh.govt.nz)