



**NDT MainCal Limited**  
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# *Radiation Protection Services*



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## RADIATION PROTECTION NEWSLETTER

To all our RPA customers:

Despite the current uncertainties about our economy, MainCal is continuing to expand its horizons. Some significant new contracts have been won during the last few months, and our radiation safety training services continue to be very popular.

To cope with the existing and anticipated workload we are very pleased to introduce a new assistant, Paul Nixon, to our radiation protection services team. Paul has over 20 years experience as a radiation protection supervisor in industrial radiography, and will be a great asset to us when providing advice and guidance in this and other sectors. Some of you will meet Paul soon as he accompanies us on our advisory visits, and we look forward to working with him.

As always we'd like to thank all of you for your support, and particularly those of you who have passed our details on to your contacts. It has long been the case that a large proportion of our new business comes from recommendations, and we like to think that this reflects the quality of service and good relationship with our customers that we continually aim for.

We hope you find some useful information in this newsletter.

### What will the regulator be looking for?

Because use of ionising radiation falls under regulatory control, this means that an HSE inspector could visit your premises at any time. If you are involved in site radiography (including what is commonly called 'open shop' on your own premises), then the probability of an inspection increases because this practice is deemed to carry the greatest risk. But what standards will the inspector expect you to meet? Of course, the IRR99 ACOP is the main 'yardstick', but help is at hand due to the government's 'freedom of information' policy. This has led the HSE to placing their published guidance for HSE inspectors in the public domain, and this can be found on the HSE website at;

<http://www.hse.gov.uk/foi/internalops/fod/oc/others.htm#ionising>

This section of the website contains a number of 'operational circulars' that are provided for specialist radiation inspectors out in the field. Although some of the circulars are now outdated, there are a number of very useful documents. For example, OC560/49 covers an inspection of a radiation employer's permanent facilities as well as site radiography, and the information in this document can be regarded as a thorough checklist of the key requirements.

Another very informative circular is OC560/53, which deals with all the procedures for 28-day and 7-day notifications. If ever you run in to a situation where you suspect that a routine report from your dosimetry service is significantly incorrect, OC560/43 contains the procedures for responding to a special entry request based on a realistic dose estimate.

We suggest you browse the contents page and look at some of the other guidance. It is our view that gaining the regulator's perspective on inspections and common issues is extremely important. It promotes better understanding and lays the basis for a level playing field for us all.

## Where should IRR99 notifications be sent to?

For some time now, 7-day notifications for site radiography have been received by the HSE office at East Grinstead, and then forwarded to the relevant specialist radiation inspector for the area where the work is to take place. Up until now though, it has been the custom of practice (and our advice) to send 28-day notifications for use of ionising radiation for the first time, or significant changes in the practice, to the local HSE office covering the area where the business is located.

In their most recent RP News article, HSE have stated that 28-day notifications should also be directed to East Grinstead. They should preferably be sent by email to: [notificationfor.ionisingradiation@hse.gsi.gov.uk](mailto:notificationfor.ionisingradiation@hse.gsi.gov.uk). From there, the notifications will be forwarded to the relevant specialist inspector. The information to be provided in a 28-day notification is set out in IRR99 schedule 2. Further details can be found by following this link: <http://www.hse.gov.uk/radiation/rpnews/rpnews290708.htm#a4>

It is worth mentioning that the RP news section of the HSE website has links to previous RP news articles that deal with a wide range of topics, and is well worth a browse.

## Are we being harmed by routine exposures to low levels of radiation?

This is an important question with a complex answer, and one that we're not attempting to deal with in depth in this short newsletter! As you might imagine, there are a number of differing scientific views on the subject. We thought we'd try and present a very simplified overview of current opinions:

For many years, it was assumed that the *probability* of a person developing long-term health problems (such as cancer) after an exposure, or of hereditary effects occurring, increases in direct proportion to the magnitude of the radiation dose received. This assumption is largely based on comparisons of survivors of the nuclear detonations in Japan at the end of World War 2 and their families, with unexposed people and their descendants.

The difficulty is that most of those individuals received fairly large doses of radiation, typically tens of millisieverts and more, whereas there is comparatively little data available on the long-term effects of, for example, a few hundred microsieveverts. Therefore, the 'bottom end' of the scale has had to be predicted. Because the known effect of higher doses follows a definite linear pattern, the best guess for the shape of the dose / effect graph seemed to be a straight line starting at zero. This is known as a 'linear no threshold' (LNT) model (see figure 1).

Figure 1: 'Linear no threshold' (LNT) model

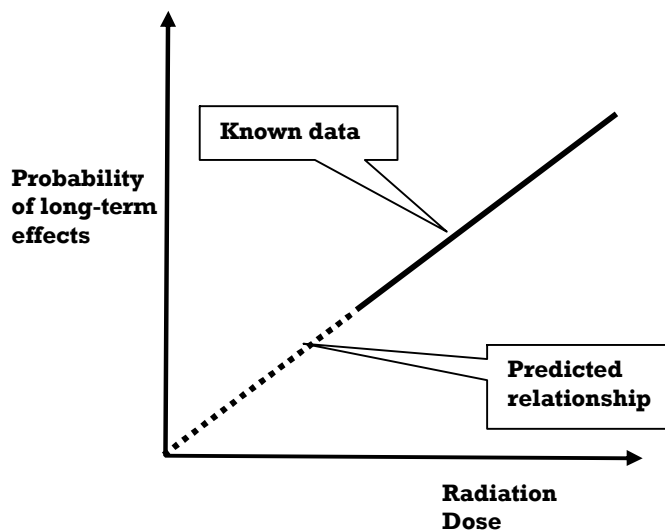


Figure 2: Possibility of dose threshold

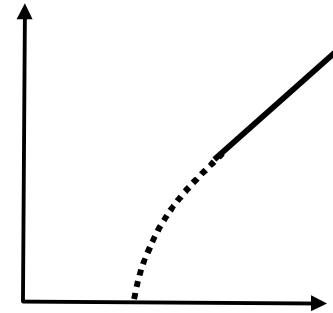
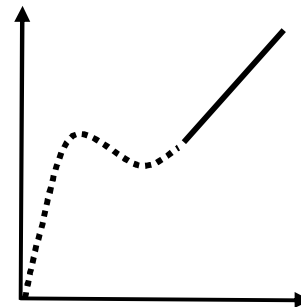


Figure 3: Recent predictions



However, research in the fields of molecular biology and genetics has indicated that the traditional LNT model may be over-simplified.

On a positive note, some scientists believe that there is a threshold, below which radiation has no effect at all (or possibly even a beneficial effect) and that the shape of the bottom end of the graph should look like figure 2. This is an optimistic view.

On the other hand, some researchers believe that the picture is more pessimistic than originally thought, because recent studies of DNA response to radiation exposure have turned up some potentially disturbing results. One is that damaged DNA has been observed to repair itself successfully, reproduce normally a few times, then mutate at random. This has led to predictions of 'genetic instability' whereby damage caused by radiation could lie dormant for a long time, or even skip generations of humans. Another peculiarity is called the 'bystander effect', where an irradiated cell somehow communicates with neighbor cells that have not been exposed and 'passes on' some of the DNA damage. The scientists involved in these studies believe that the low-dose relationship may in reality look more like figure 3.

Added to all of the above is the complication of how the effects of radiation may combine with other factors such as exposure to various chemicals, the environment, genetic history, lifestyle, etc. etc. etc! So the bottom line is that we're still not certain.

But, while the scientists continue to debate about what's going on in their test tubes, they all agree that because of the uncertainties surrounding long-term effects, we must keep rigorously applying the three fundamental principals of radiation protection. These are 1) *Justification*, the benefits of working with radiation must significantly outweigh the risks, 2) *Optimisation*, gaining the maximum benefit from use of radiation, while causing the lowest possible exposure to people, and 3) *Limitation*, not permitting exposures above levels that are deemed to be harmful.

Given that we work in occupations where use of radiation is justified, and that the limits are set for us in IRR99, then *optimisation* becomes critical. We should keep striving to make our work even safer, and continually look for ways to reduce or eliminate unnecessary exposures. Hopefully then, even if the pessimists prove to be correct, we'll not be putting ourselves or future generations at risk!

## Electronic reporting for UK Safeguards (Euratom)

If you keep radioactive sources in depleted uranium (DU) containers, you'll probably know that you must report the amount of DU you own to UK Safeguards. This is usually an annual report, unless you import or export containers outside the European Union.

As of this year, you are now required to use an electronically generated form for the reports, using some software called ENMAS Light. The program is a free download but you'll need some instructions on how to access it; if you email Minder Louie at UK safeguards ([Minder.Louie@hse.gsi.gov.uk](mailto:Minder.Louie@hse.gsi.gov.uk)), she'll send you a step-by-step instruction sheet. The form you'll normally use is 'Annex X', and if you're using the simplified reporting scheme then all you do is report (once per year) the total weight of DU that you hold. If you need assistance with completion of the forms, then please get in touch with us or contact Minder.

There is a possibility of UK Safeguards running a seminar focusing on use of the ENMAS software; we'll keep a lookout for details and let you know.

## A change that should benefit everyone

Ever since we began providing RPA services, we've always viewed our advisory visit reports as a primary 'product', and over the years the presentation of our reports has evolved into a format that we believe works very well. Our reports are of course generated on a computer, and it is now commonplace for us to transmit an electronic copy to our customers so they have the information more quickly. Despite this, we've traditionally always sent a paper copy through the post by way of confirmation.

Now you don't need us to tell you that times are changing! Practically every business in the country now has access to the internet and email, and although there's a long way to go, the trend toward the 'paperless office' continues. Printing and mailing paper documents is, in the opinion of many people, unfriendly to the environment. It costs time and money, uses valuable resources, and is rapidly becoming an outdated practice for many service-based organisations.

So we've considered the issue, and we think there are good reasons to change. We've therefore taken the decision that unless there is a need for paper copies, our reports, letters quotes, etc. will in future be sent by email only, in the universally accepted 'pdf' format. For anyone who hasn't got it, you can download the free Adobe Acrobat 'pdf' reader from their website, [www.adobe.com/uk](http://www.adobe.com/uk).

Of course, if anyone still needs paper copies we're more than happy to oblige, so please let us know. We're quite sure however that most of you will agree with the change - in fact, you're probably implementing similar measures of your own as we all continue to move with the times.

*Very best wishes from all of the team at MainCal*