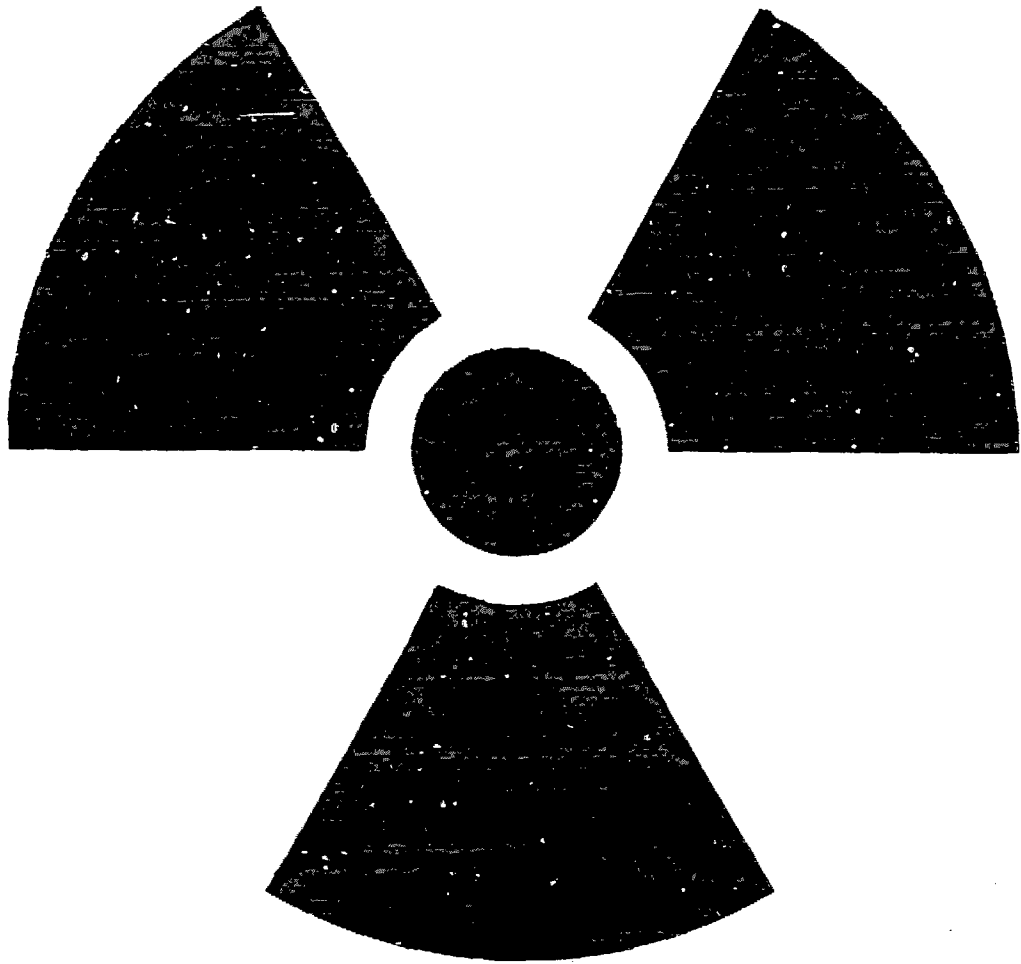


RADIATION



**KEEP
OUT**

IS THERE AN ISOTOPE ON YOUR BOOKS?

Advice to receivers and liquidators on dealing with radioactive sources and x-ray equipment.

TONY COLGAN

In December, 1983, workers in the Mexican city of Ciudad Jerez, near the Mexican border, were asked to clear the contents of a local hospital warehouse. Unknown to them, the warehouse contained an unused radiotherapy unit, purchased in 1977 for the treatment of cancer patients. Some of the machine's parts, including thousands of pellets of a radioactive isotope called Cobalt-60, found their way to a local steel mill where they were melted down and incorporated into approx. 1,800 tonnes of table bases and reinforcing bars used in the manufacture of reinforced concrete.

The mistake was only discovered several months later when a lorry carrying some of the steel drove past the Los Alamos Research Centre in New Mexico, setting off that establishment's radiation alarms. By then some of the steel had already been installed in the walls of buildings in the US and up to 30,000 table legs had been exported to restaurants in Canada. All of these were recalled, while in Mexico several hundred

houses, constructed with the contaminated reinforcing bars, had to be pulled down.

In the mill itself, over 3,000 people were exposed to radiation, and 150 of these underwent hospital treatment. Several people received a dose of radiation sufficient to cause radiation sickness, and two of the male workers are now sterile as a result of the incident. The task of tracing the steel in Mexico is still continuing. Health inspectors, normally employed in checking sanitary conditions in shops and offices, have been equipped with geiger counters and told to look for signs of radiation. Meanwhile, several thousand tonnes of contaminated waste await disposal in an old silver mine in the Chihuahua mountains.

A bizarre example, perhaps, but nevertheless a very graphic illustration of what can happen when the custody of radioactive materials is not afforded due care and attention. While all of us are exposed to natural sources of radiation, exposure to man-made sources is a much more recent

development, but one with which we all come in contact, either directly or indirectly, every day.

X-rays and radioactive sources are routinely used in hospitals for the diagnosis and treatment of illness. Also, all the syringes, gauzes, bandages and instruments used are now routinely sterilized, normally by exposure to high doses of gamma radiation. The smoke detector in your office or home probably contains a small amount of radioactive Americium-241. If you have a felt roof on your house, chances are that during installation the moisture content was checked using a gauge incorporating radioactive sources. In Irish industry, applications of radioactivity include the measurement and control of the thickness of paper and plastics during production, measurement of the level of fill in bottles, and the monitoring of tobacco density during cigarette manufacture.

Chartered accountants are most likely to encounter the wide range of radioactive sources used in industry, particularly when com-

panies go into receivership or liquidation. It is important, therefore, that accountants are aware of the law as it is currently written, and also fulfil their responsibilities when arranging sale or disposal of these items.

The Law

The Nuclear Energy (An Bord Fuinnimh Nuicleigh) Act, 1971 and the Nuclear Energy (General Control of Fissile fuels, Radioactive Substances and Irradiating Apparatus) Order, 1977 prohibit the custody, use, manufacture, importation, distribution, transportation, exportation or any other disposal of radioactive materials save under licence issued by the Nuclear Energy Board. The Board is also empowered to attach to licences such conditions as it deems necessary.

In practice, there are approximately 125 industrial users of radioactive materials in the Irish Republic licensed by the Board. Each licence has attached to it a set of conditions which are tailor-made for each user and reflect the nature and extent of the sources of radiation in use at the plant. Requirements of the Board with regard to storage, use, maintenance, etc., are laid down as appropriate and regular inspections are carried out to ensure that these conditions are being complied with.

Disposal

Of particular importance to receivers and liquidators is the condition attached to each licence requiring that the items for which the licence is held shall not be disposed of without the prior authorisation of the Board, in writing. In the normal course of events, this ensures that proper dismantling and packaging of sources takes place before shipment, and that the new owner is aware of his responsibilities and holds the necessary licences for the equipment he is about to purchase. In the case of liquidation, where the equipment may go to auction, this is even more important if accidents such as that described earlier are to be avoided.

Another important requirement of each licence is that a Radiological Protection officer (RPO) be appointed. This is the person within the company who has primary responsibility for the security and safety of all radioactive sources and for X-ray equip-

ment, and who will normally act as the liaison between the company and the Nuclear Energy Board. The RPO will have specialist knowledge in the field of radiation safety commensurate with the extent of radiation usage on site.

When a company goes into receivership or liquidation, the RPO will normally inform the Board of the situation, and the Board in turn will write to the receiver informing him of the presence of radioactive sources on site. In many cases, and for various reasons, this procedure may not be followed, and the liquidator or receiver may very often be unaware, at least in the early stages, of the presence of potentially lethal radiation-emitting devices or equipment on site. So how, therefore, can those responsible for winding up the company ensure that personnel are not inadvertently exposed to significant doses of radiation from such devices or equipment?

There are many tell-tale signs that can indicate the presence of radioactive materials. These include:

1. A copy of the licence, similar to that shown in Fig. 1 may be displayed on one of the noticeboards. Alternatively, a copy may be found somewhere within the filing system. Licences all bear the dates of validity and are normally issued for a one-year period.
2. All radioactive sources are required to bear the trefoil radioactive symbol as indicated in Fig. 2. This is normally black on a yellow background and will often be accompanied by the words "CAUTION RADIOACTIVE MATERIAL" or other similar warnings.
3. X-ray units may not always be easily identifiable. Perusal of a list of the equipment held on site will normally reveal their presence, while equipment manufactured by companies whose names include words such as 'Nuclear' or 'Radiological' would entice one to investigate a little further.
4. If one of the previous three indications are present, and you are still uneasy about the situation, then a telephone call to the Nuclear Energy Board will either confirm or allay your suspicions.

It is important to realise that, while several radioactive sources are portable and of small activity, many others may be an integral part of very complex and costly equipment, and specialist knowledge may be required if dismantling proves necessary. This can normally be provided by the company RPO (his name will be listed on the licence issued by the Board), or in his absence the Nuclear Energy Board will be pleased to offer its advice and assistance in this matter. In some cases, the equipment may already have dismantled, and you should satisfy yourself that this has been safely and securely done. Again, the PRO or Nuclear Energy Board can be consulted in the matter.

Once arrangements have been made for the final sale or disposal of the licensed items, the Nuclear Energy Board should be informed of the relevant details; only when their written approval has been received may you proceed. If the items are to be sold abroad, the necessary documentation for customs clearance will be issued by the Board. Sale within Ireland requires that the purchaser holds a licence for the items, and that they are suitable for the intended application.

In summary, accountants appointed as liquidators or receivers should be guided by the following advice:

- There is a potential application of radioactivity in virtually every Irish industry. The company for which you are made responsible may have one or several radioactive sources or pieces of X-ray equipment on site. CHECK IT OUT.
- Speak with the Radiological Protection Officer about the nature of the equipment, and make sure that it is either dismantled and safely stored or left in a safe position so that no emission of radiation is possible.
- Advise potential buyers within the Republic of Ireland of the need to hold a licence from the Nuclear Energy Board and to have the intended use of the equipment approved by the Board.
- Once all arrangements have been finalised, advise the Board in writing of your proposed actions regarding sale or disposal. Await approval before allowing the equipment to leave site.



Licence No.

LICENCE

An Bord Fuinnimh Nuicleigh, in accordance with the terms of the Nuclear Energy (General Control of Fissile Fuels, Radioactive Substances and Irradiating Apparatus) Order, 1977 S.I. No. 166 of 1977, hereby licenses

.....
to carry on the following activities

.....
of Radioactive Substances/Irradiating Apparatus listed in Schedule 2
subject to the conditions given in Schedule 1. These conditions may be varied or added to from time to time at the discretion of An Bord Fuinnimh Nuicleigh, hereinafter referred to as the Board.

This licence is valid from to

This licence does not exempt the licensee from compliance with other regulations or statutory requirements relating to the licensed items.

Official Stamp

Signed Nuclear Energy Board

Date 20-22 Lower Hatch Street
Dublin 2, Ireland
Telephone 764375/766223
Telex 30610

FIGURE 1



FIGURE 2