

# radiation



## INTRODUCTION

Radiation is the generic term for energy emitted in the form of electromagnetic waves or particles. It includes energy from cosmic rays, gamma rays, x-rays, ultraviolet light, infra red and radio waves.

Radioactivity is not itself a pollutant but radioactive gases and particles can be breathed into the lungs and hence is of concern.

Although we are continuously exposed to natural radiation, Southwark like the southeast generally, does not suffer the most common exposure, from radon and thoron, as found in granite based areas.

Of greater public concern is radiation from man-made sources and emissions although there is no difference between the effects of anthropogenic or natural radiation. Two forms of radiation emitted by radioisotopes are of special interest in air pollution;  $\beta$ -radiation (particulate) and the more penetrating  $\gamma$ -radiation (electro-magnetic).

## HEALTH EFFECTS

The potential hazard from inhalation of radioactivity in the ambient air is generally less than that due to the ingestion of radioactivity in food and water. However, inhalation can cause lung cancer and a low level of exposure experienced over a long period of time may lead to hereditary defects. Very high exposure, about 2000 times the typical annual exposure, may cause reddening of the skin, cataracts, sterility or death.

At the levels of exposure from all sources there are generally no observable short term effects. Most radiation passes straight through or bodies.

## OTHER EFFECTS

The chemical changes induced by radiation can affect all living cells hence animals and plants can be equally affected by radiation.

Generally there are no large scale observable effects on other inorganic materials.

## SOURCES

Other than natural radiation the most significant sources are from accidents during nuclear electricity generation, fallout from nuclear weapons testing and the use of radioactive materials in medicine, industry and research. Anthropogenic emissions began in 1930 and Britain's first nuclear power station was commissioned in 1962. The following year saw the introduction of an international partial ban on nuclear weapons testing.

About 90% of exposure to the public is from natural radiation and most exposure to artificial radiation is due to medical procedures such as chest and dental x-rays.

Other than medical use and small scale research there are no sources within Southwark. However the effects from sources outside Southwark (and the UK) can be observed here.

## STANDARDS

There are no standards for radiation as a pollutant but the UK has adopted the recommendations for radiation protection of the International Commission on Radiological Protection. Control of radiation hazards at work is regulated by the Ionising Radiations Regulations 1985 and this includes an annual (whole body) dose limit for the general public.

## POLLUTION TRENDS



## MONITORING SITES

Radiation has been monitored at one location shown in figure 7.1

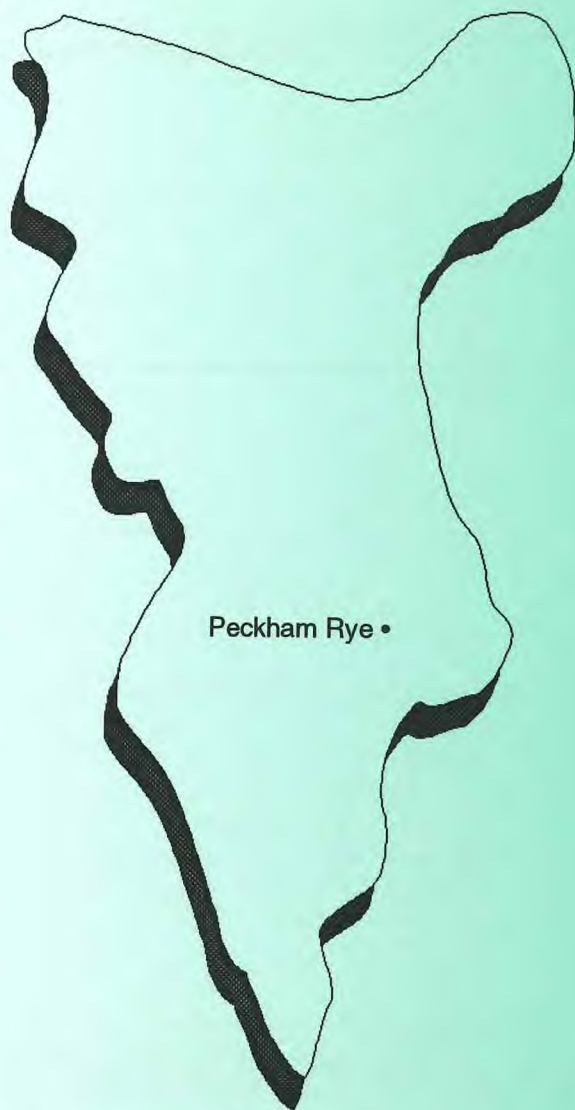


Figure 7.1 Radiation monitoring site

## COMMENTARY

The following graphs show that the levels recorded in Southwark are generally in line with those for London. The graphs would not be directly comparable with those of levels from the rest of the UK without a correction for local sources such as radon. However the levels are relatively low with no significant incidents of elevated levels being recorded. Although comparable data for 1986, the year of the Chernobyl accident, are not available the current levels are considerably lower than those recorded nationally at that time.

There is a fundamental problem when considering radiation levels in that the health risk is associated with exposure ie. a dose received, which varies throughout the population. For example Chernobyl fallout, whilst finite and measurable, was greater in areas where it was raining at the time and although the first year exposure was typically increased by one percent some people may have received increases of up to 40 percent because of where they lived and what they ate.

*Note: The units shown on the vertical axis on the following graphs are in Becquerels per cubic metre ( $Bq/m^3$ ). The Becquerel is a unit of activity ie. rate of decay, and is equal to one disintegration per second.  $Bq/m^3$  is therefore a derived measure of air concentration.*

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## LEVELS AND TRENDS

This graph shows the levels of beta activity measured at the location shown in figure 7.1.

The graph in figure 7.2 shows, for comparison, the average levels of beta activity recorded in London for the same period.



Figure 7.2 Radiation levels at Peckham Rye  
April 1990 to December 1992



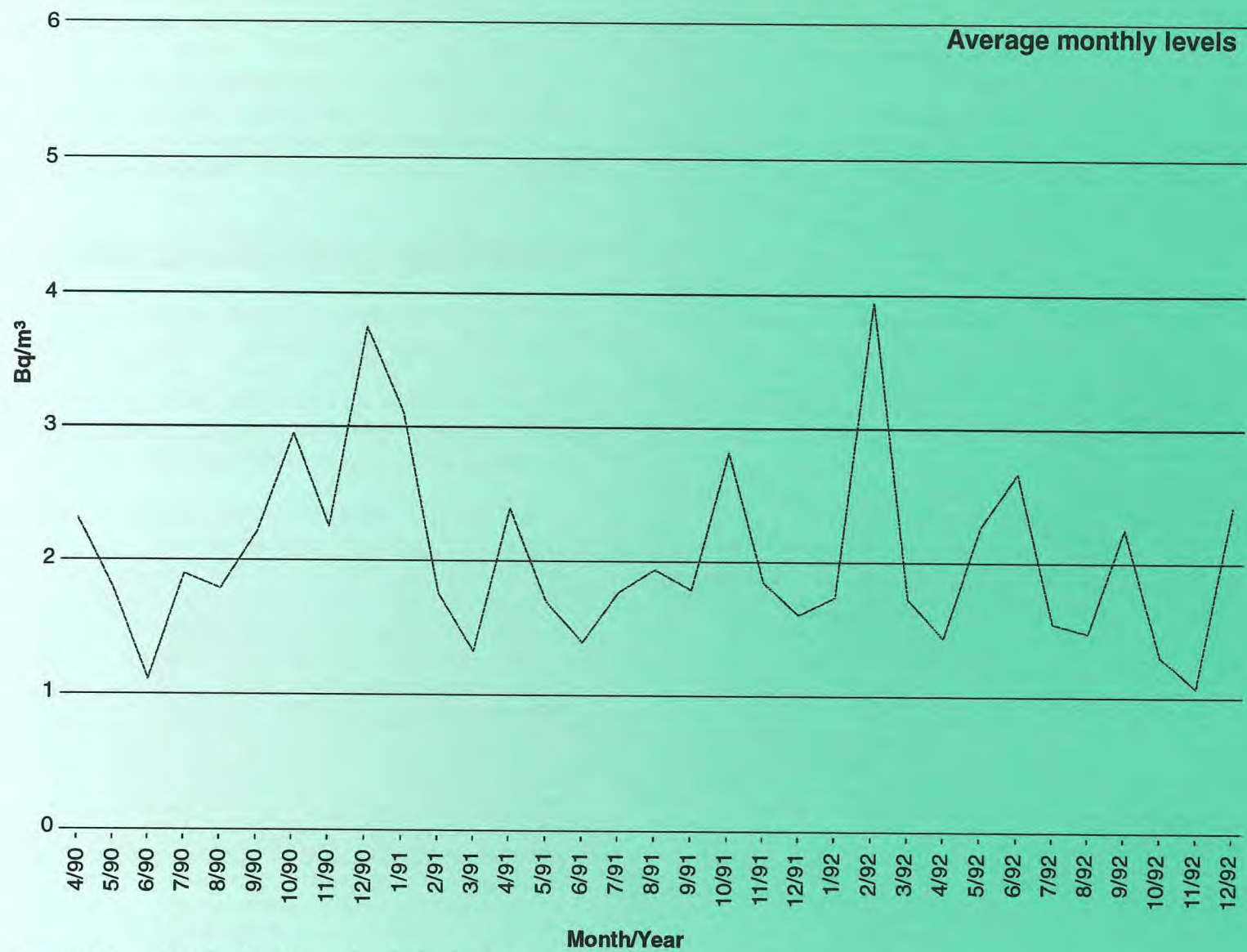


Figure 7.3 London background radiation levels

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