



# Infant leukaemias near nuclear power stations

By Dr Ian Fairlie

## Introduction

Although the government is apparently committed to building new nuclear reactors, a recent powerful study has indicated a serious health problem, in fact a possible show-stopper, over its nuclear proposals.

In 2008, a major 4-year health study found large increases in infant cancers near all German nuclear power stations. The study had been confidently commissioned to show no such health problems, instead it revealed the opposite. The study (called KiKK, the German acronym for child leukaemias near nuclear reactors – Kinderkrebs in der Umgebung von KernKraftwerken) reported a 2.2-fold increase in leukaemia risks and a 1.6-fold increase in embryonal cancer risks among children under five living within five km of all German nuclear power stations. KiKK found the cancer increases were firmly linked to proximity to nuclear power plants. Its report sparked off a major furore in Germany, but the study has been little reported on here. KiKK is significant for the UK because the radionuclide emissions from UK reactors (both existing and proposed) are practically the same as those from German reactors.

Scientifically speaking, the KiKK study commands attention for a number of reasons. First is its large size and case-control format: it examined all cancers at all 16 nuclear reactor locations in Germany between 1980 and 2003, including 1,592 under-fives with cancer and 4,735 controls, with 593 under-fives with leukaemia and 1,766 controls. This means the study is very strong and its findings statistically significant: small numbers and weak statistical significance often limit the usefulness of smaller epidemiological studies, for example those recently commissioned by the UK government.

Second is its authority: it was commissioned in 2003 by the German Government's Bundesamt für Strahlenschutz (Federal Office for Radiation Protection) after requests by German citizen groups.

The study was carried out by epidemiology teams from the University of Mainz who, ironically, were in favour of nuclear power.

Third is the validity of its results. These were confirmed by the German government's nuclear regulator, Bundesamt für Strahlenschutz. A later report by Germany's more senior radiation health commission (Strahlenschutzkommission) stated the cancer increases existed but the reasons remained unknown. It is now officially accepted in Germany that children living near nuclear power plants develop cancer and leukaemia more frequently than those living further away.

The findings were a shock for the German nuclear industry. KiKK's findings are partly the reason why Germany is not building new reactors, with the result that German nuclear operators (E.ON and RWE) are now proposing them, not in Germany, but in the UK instead – and with our government's strong encouragement. Shouldn't we be more concerned about this?

## Possible causes

We are unsure of the reasons or mechanisms for the cancer increases near nuclear power plants, and government sponsored studies in several European countries are searching for an explanation. Here in the UK, at least three studies are underway, but their results are not expected until the spring of 2010 at the earliest.

Some independent scientists think that high radiation doses to the embryos and foetuses of pregnant women near the reactors may have caused the increased cancers among their subsequent babies. This is because embryos and foetuses are extremely radiosensitive – sufficiently so to be damaged by the relatively small radiation doses from the radioactive discharges at nuclear power stations. But whatever the reason, the new evidence shows that living near nuclear reactors carries serious health risks for babies

and infants – more than doubling their risk of leukaemia. If the nuclear industry and the government ignore this evidence, they could find themselves being sued by parents of leukaemic children.

### **UK reaction**

In the UK, the Chairman of the government's Committee on the Medical Aspects of Radiation in the Environment (COMARE) initially denied the KiKK findings, stating in a letter to nuclear site stakeholder groups that recent UK and French studies did not support the KiKK results. However this letter was officially withdrawn following criticisms and at present COMARE has no policy on the KiKK report. For almost two years, COMARE largely ignored the KiKK findings, but finally in October 2009, the Department of Health instructed COMARE to look into the KiKK study. Reluctantly, COMARE set up a subcommittee to do this: its report is not expected until April 2010.

The above criticisms stated that the UK and French studies had incorrectly concluded there was 'no evidence' of increased cancers, but the correct UK conclusion should have been they found an increase of 24%, which was not statistically significant at the 5% level, (contrary to what many people think, lack of statistical significance does NOT mean lack of association, merely that the study was too small for statistically-significant results). Leukaemia is a rare disease and you need large studies to pick up increases – hence the importance of the large KiKK study which did pick them up. Equally important, KiKK is a case-control study – far more dependable than simple observed/expected ratios used in the UK and French studies. The point here is that COMARE should have been guided by the large KiKK study with a dependable format and not the small unreliable French and UK ones. In fact, some scientists suspect the French and UK studies were rushed out in 2008 in panic attempts to deflect and discredit the KiKK report.

### **Any other evidence?**

Have the German findings been supported by other studies? In one word, yes. In 2008, French scientists carried out a literature review of 26 multi-site studies of childhood cancer near nuclear facilities throughout the world. This followed an earlier study in 1999 which listed another 50 studies (36 single-site and 14 multi-site). In other words, over 60 studies have examined this matter and over 70% of them revealed pronounced cancer increases. I can think of no other instance – with chemical or biological toxins for example – where such a large number of studies have investigated a specific health effect near establishments emitting a specific hazard – in this case radionuclides.

In addition, researchers in South Carolina in 2007 carried out a large meta-analysis (ie a combined study which improves statistical strength) of 136 nuclear sites in the UK, Canada, France, US, Germany, Japan and Spain. The study strongly supported the KiKK results, finding increased incidences of child leukaemia and raised child cancer death rates, depending on the proximity to nuclear facilities.

Most independent scientists consider the above to be convincing, if not overwhelming, evidence of an association between nuclear power plants and infant cancers, but unfortunately many nuclear scientists remain in denial and disagree with this conclusion.

### **Justification**

As stated above, many scientists are continuing to discuss the likely causes of the KiKK cancer increases, and here in the UK there are at least three on-going studies into cancers near UK nuclear facilities. Unfortunately, the government, which is strongly committed to building more nuclear power stations, is doing everything it can to ignore or deny these findings and new studies. For example, in November 2009, it initiated a Consultation on its proposals to 'justify' radiation exposures from proposed new nuclear power stations, (justification requires those who propose nuclear power stations to balance their radiation health risks versus their putative economic benefits. It is a legal obligation forced on the government, much against its wishes, under a little-known EU Directive). Clearly, evidence of infant cancers near UK nuclear power stations is extremely relevant in any 'justification'. But the closing date for comments on this Consultation is 22 February 2010, well before the results of the above three studies will be available. And the government has point blank refused official requests by NGOs to extend the comments deadline.

### **Conclusion**

As scientists discuss the likely reasons, this new powerful KiKK evidence of a direct link between child cancer and proximity to nuclear facilities raises difficult questions. Should pregnant women and women with young babies be advised to move away from existing nuclear power stations? Should local residents be advised not to eat fruit or vegetables from their gardens? But most important, shouldn't the UK government be rethinking its nuclear policies?

■ Dr Ian Fairlie is an independent consultant on radioactivity in the environment. Between 2000 and 2004 he was Scientific Secretary to the government's Committee Examining Radiation Risks of Internal Emitters (CERRIE).