but this was resolved by NASA engineers. Ironically, while the problems with HEAO 2 were being worked on, gyroscope problems also developed in its successor HEAO 3, which was intended merely for a six-month mission.

In this case, a command sent to HEAO 3 caused it inadvertently to start drifting from its proper position, leading its control computers to switch the satellite into a "safe" mode. However, this problem is again said by NASA engineers to have been solved.

The HEAO satellites are not the only space activities encountering technical problems. Thus NASA officials are now carrying out an in-depth review of the space telescope programme and are concerned about the possible combined effects of cost overruns and schedule slips.

The critical design review of the telescope has been put back from this summer until January 1981, partly because of the need to redesign the wide-field planetary camera to save weight. In addition, the fine-polishing of the primary mirrors for the telescope is behind schedule; and various contractors for the space telescope project, due to be launched from the space shuttle in early 1984, are complaining that they have been allocated insufficient manpower and funds to keep the programme on schedule.

NASA is soon expected to announce the results of a competition for the location of the Space Telescope Institute, which will collect and analyse data from the telescope. The three main contenders are Johns Hopkins University in Baltimore, Princeton University and the Fermi National Accelerator near Chicago. Two groups — Associated Universities Inc. and Universities Space Research Association — have drawn up separate plans for locating the institute at Princeton. The Baltimore site is being proposed by the Association of Universities for Research in Astronomy and Fermilab by the Universities Research Association Inc., which already operates the laboratory's accelerator for the Department of Energy.

**David Dickson**

## Radiation safety

# X-ray survey

A plea for more effective steps to reduce the radiological dose to the gonads of patients from X-ray diagnosis has been put out by the National Radiological Protection Board (NRPB). The board is especially concerned about young adults, and says that if they were protected as well as children usually are, then the genetically significant dose to the British population from diagnostic radiology could be reduced by 40–50 per cent.

The NRPB set out to investigate whether the lessons from a similar study in 1957 under Lord Adrian had been learnt. That study concluded that the dose to the gonads of individuals could be reduced by the use of better radiological techniques, such as narrower beam widths. It also found that gonad dose from the same types of examination varied considerably, sometimes by as much as a factor of three or four between different parts of the United Kingdom.

The new study has found that the genetically significant dose — the average gonad dose per head of population weighted for child expectancy data — has remained approximately the same over the past 20 years despite a 50 per cent increase in the annual number of radiological examinations, suggesting that techniques have indeed improved. But it has also found that local variations in dose for the same examinations are as great as they were in 1957, suggesting that the use of gonad protection varies from place to place.

With this said, the NRPB is not alarmed. The "genetically significant dose" in Britain is still considerably less than in most other industrialized countries and could be responsible for a total of 100 genetic defects a year compared with a rate of 20,000 cases of genetic birth damage each year. Nevertheless, according to one of the reports, a reduction of only 10 per cent in the contribution to the genetically significant dose from diagnostic radiology would be the equivalent of the present contribution from nuclear power. As techniques for reducing the radiological contribution are easily available and relatively inexpensive compared with those needed to achieve a similar reduction from nuclear power, the NRPB says they should be implemented.

The study, based on data about radiological investigations in 1977, measured the gonadal dose in a sample of patients undergoing different types of examinations. The genetically significant dose is inferred from child expectancy data.

A breakdown of examinations into type reveals that most have increased in frequency whereas a few have decreased. A substantial factor in keeping the genetically significant dose down to its 1957 level is the large reduction in the number of obstetric radiological examinations. Their contribution to the genetically significant dose has fallen from 4.5 mrad in 1957 to 0.6 mrad now.

Although the NRPB study claims that there is probably room for further reductions of the genetically significant dose, it has few practical suggestions as to how this might be done. Nor does the NRPB fully understand the large differences of gonadal doses for the same examination in different parts of the country. It also acknowledges that gonad shields cannot be used in all cases, especially where they would obscure organs to be investigated. The plan is to discuss the findings with radiologists later in the year in the hope of finding ways to reduce the genetically significant dose.

**Judy Redfearn**

## DNA guidelines

# More relaxation

*Washington*

The National Institutes of Health (NIH) are expected shortly to reduce the burden of recombinant DNA regulations on research workers. This follows the recommendation of the institute's Recombinant DNA Advisory Committee (RAC) that details of virtually all experiments covered by the current safety guidelines need no longer be submitted to NIH for review.

At the same time, RAC has decided that NIH should limit their attempts to oversee recombinant DNA activities carried out in the private sector. In particular, the committee has proposed a procedure for checking on the biological aspects of large-scale experiments, but is suggesting that it should now restrict itself to general comments on the physical aspects of the fermentation and containment technology rather than reviewing each proposal submitted.

RAC has not gone as far as some would like. At a meeting in Bethesda, Maryland, last week, it decided to defer action on a proposal that clearance from local institutional biosafety committees (IBCs) should no longer be required before a research worker carries out an experiment in containment conditions specified in the guidelines.

The proposals for a procedural change in the guidelines were put to RAC by Dr Maxine Singer, head of the National Cancer Institute's biochemistry laboratory and a prominent participant in the 1973 Gordon conference which first drew attention to the need for caution in recombinant DNA research.

Dr Singer told the committee that many scientists felt that there was unnecessary delay in waiting for the Memoranda of Understanding and Agreement, required by NIH, to be approved by IBCs before research was allowed to begin. Also, there was impatience with the requirement for central review of experiments where the safety procedures to be followed were relatively straightforward.

On the latter point, committee members readily accepted Dr Singer's proposal that central registration be eliminated. Such registration is already no longer required for the bulk of recombinant DNA experiments, those carried out with the disabled K12 strain of the bacterium *Escherichia coli*. The new proposal would chiefly affect experiments being conducted in P2 and P3 physical containment conditions; the status of experiments now requiring the NIH director's explicit approval would not be altered.

More controversial was the proposal to remove the requirement for prior review of experiments by IBCs. Debate on this was coloured by a report presented to the committee on the performance of 19 IBCs

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