NIH estimate of the sources of income of a typical pre-clinical research laboratory in the United States (percentages of total).

More immediately troublesome for research workers is the need to give precise estimates of how much time they spend on projects.

Circular A-21 relaxed the time-and-effort demand by agreeing that faculty members need only complete such a record at the end of every term rather than every month (reports on technicians are still required monthly), and offering the alternative of "workload monitoring" where time allocation is agreed before a project is begun.

But research workers still find the system oppressive. Many claim it is unreasonable, for example, for a research scientist in a medical school to decide how time has been distributed between functions that may have been carried out simultaneously. "It is impossible to allocate one's time between research, training and patient care, and it is a sham to try to impose it," Dr David Kipnis, chairman of Washington University's School of Medicine, told last week's meeting.

Others argue about the difficulty of shifting from the rigours of scientific quantification to the "creative fictions" of the accountant. "We put a high degree of rigour on the numbers that we generate. So when we get a form asking us to put down numbers, we tend to think that they are the same type of numbers, ignoring the fact that they may not correspond to our notion of reality," said committee member Dr Howard Temin, professor of oncology at the University of Wisconsin.

Government auditors are unbowed. They insist that the revised A-21 requirements have considerably reduced the reporting load. They also point out that current auditing requirements follow directly from the way Congress has chosen to support biomedical research.

This has prompted increasing suggestions that alternative ways of supporting research should be explored. In a report on funding mechanisms soon to be published, for example, the National Commission on

Research (NCR) suggests that experiments be made with locally-managed grants-in-aid, shifting the emphasis from detailed financial accountability to scientific accountability.

Under such a system, a grant proposal would still be closely scrutinised by the funding agency using the full peer review process. But once the money had been allocated, the investigators' prime responsibility to the agency would be to report on the technical aspects of the research. Administrative details would become the responsibility of the investigator and his or her university, with the funding system becoming the main incentive for the wise management of resources.

NIH is keen to encourage experiments along these lines for certain types of grants, according to director Dr Donald Fredrickson, while OMB officials say that, in principle, such a basis would be acceptable and simpler to administer.

In a different context, the National Science Board, the governing body of the National Science Foundation, has given some thought to the merits of block-grants to universities, so far without conclusion.

Not all universities relish the prospect of having to decide how a research worker is entitled to spend a federal grant. In addition to the increased administrative load, one result could be to translate current tensions between scientists and government accountants into the university setting. And there are several procedural issues, such as the way that indirect costs are calculated (currently as a proportion of the salaries and wages included in the grant) that would need to be revised.

The NCR, a body set up two years ago to examine all aspects of research funding, considers that these changes could work. But it urges the need for experiments. The National Science Foundation is already experimenting with post-award aggregation of grants to a selected number of university chemistry departments. The NIH, which supports almost 50 per cent of federally-sponsored university research, is planning to follow suit.

David Dickson

PWR design

UK programme gathers steam

DESIGN work on modifying the Westinghouse pressurised water reactor system to meet British safety standards has begun "in earnest" following a letter of intent issued by the UK Central Electricity Generating Board to the Nuclear Power Corporation late last month.

The NPC is increasing the staff of its light water reactor team from 80 to 170 by

the end of September, and plans a total of 400 by the end of 1982. Design staff, who are not nuclear experts as such, are being recruited from engineering fields associated with complicated plant design including piping engineers, quality control draftsmen, power engineers and computer specialists. In addition the NPC is transferring part of its existing staff of 1,200 to PWR work. Included in this number are engineers from the advanced gas cooled reactors located in Hartlepool, Heysham and Dungeness. Two NPC engineers will fly to Pittsburgh next month to work with a Westinghouse licensing group on the transfer of the details of PWR technology to the UK. Five Westinghouse engineers will join the NPC team next month to work on modification of the Westinghouse design to meet UK standards. Technical support from Westinghouse will grow to about 100 professionals by 1982.

NPC staff is concentrating its present efforts on computer simulations of safety procedures and on physical modelling of the layout of the 1100 MW reactor. The design of steam, water, gas and cable runs is to conform with British safety procedures developed through experience in petrochemical plant design.

In conjunction with engineers from the CEBG, the NPC will prepare its modifications of the Westinghouse system which includes a novel "double skin" consisting of two concentric concrete cylinders with the reactor hardware in the inner cylinder and the safety and standby systems in the outer cylinder to meet operator radiation dose standards and plant standby power requirements, and to "relieve burden on the human element". The design work will cost £3.5 million.

The Nuclear Installations Inspectorate says that it expects to receive the CEBG's preliminary safety report — a general outline of the standard safety procedures to ensure reactor safety — within the next few months. This will be followed by a "steady flow" of design information beginning with a safety analysis of the main design followed by fault analyses of particular areas ranging from pressure vessel integrity and the possibility of fast fracture from small cracks (*Nature*, 28 February, p804) to the reliability of used equipment and component failure records. In spite of staff shortages, the NII expects no difficulty in meeting its obligations to evaluate PWR safety.

Approval of the design modifications by the NII by 1982 will be followed by an application by the CEBG for a nuclear site license at the Magnox reactor site at Sizewell. At the same time, the promised public inquiry will also be announced and the safety documentation will be released in accordance with the government's announcement on 18 December 1979 that "principal safety documentation relevant to the initial licensing will be published and made available before the inquiry".

Jo Schwartz