

UK atomic energy

Design delays

British hopes of building a pressurized water reactor (PWR) seem now to rest on Dr Walter Marshall, chairman of the UK Atomic Energy Authority, who was last week appointed by the Department of Energy as chairman of a "task force" intended to stifle squabbles about the project — and to help reduce the cost. This development is a consequence of mounting impatience among Marshall and his colleagues on the four-man "nuclear industry group" with the delays that have accumulated in the PWR programme; they put their complaints in a letter to the Department of Energy three weeks ago.

As yet, the National Nuclear Corporation — the putative constructor — has not completed the reactor design, which should have been sent to the Nuclear Installations Inspectorate in the spring. Like a schoolboy late with his homework,



Marshall the catalyst

the corporation was able to manage by the deadline only a "reference design" that omitted details of the containment vessel and the emergency core cooling system. The missing information has not yet materialized because the corporation (and the Central Electricity Generating Board, which will have to pay for the reactor) have had cold feet about the cost.

Several modifications of the basic Westinghouse design have added to the cost. The generating board has asked for relatively easy access to the steam supply parts of the system to reduce maintenance time and the radiation exposure of workers. The containment building for the reactor was intended to have a double-walled construction, some concrete shielding was intended to be extra thick and there were to have been four (rather than two) emergency core cooling systems.

However, critics of these changes say they substitute concrete and equipment for analysis. Good chemical control of the steam supply system — for example, by purging the steam supply system before

dismantling for refuelling — can reduce radiation doses to levels acceptable to the generating board, say the critics, without using more concrete. (The board has indicated that it will not accept levels higher than those at the Heysham advanced gas-cooled reactor, a relatively clean power plant.) Some American utilities already use the hydrogen peroxide method in their PWRs. So this week a team of National Nuclear Corporation and generating board scientists has flown out to inspect such "best practice" in American reactors, and make its own measurements of radiation.

Similarly, the net benefit of quadrupling the emergency core cooling system could be obtained more cheaply by looking closely at the failure rate and significance of individual components of the system. The containment building will also probably be simpler, and similar to the optional construction designed by the Bechtel Corporation which is acting as consulting engineers to the National Nuclear Corporation.

What has worried Marshall, and now apparently the Department of Energy, is that the pursuit of perfection at the National Nuclear Corporation has been time-consuming as well as potentially expensive. His task force will function not as a decision-making body but as a forum in which the designers can be shamed into making up their minds.

All of the questions to be tackled relate to safety, and most of them involve trade-offs against cost. Marshall hopes that the outcome will be a reactor with a construction cost (per kW of generating capacity) only 60 per cent of the cost of the advanced gas-cooled reactor. He may have to be satisfied with less. Although some of the refinements of the Westinghouse design may have to be abandoned, Marshall is confident that the reactor can be built within British safety criteria.

The plan now is that the final design should be with the nuclear inspectors in the autumn. With a lot of luck, it may still be possible for the government to hold its promised public inquiry on the project before the end of 1982, almost exactly a decade after the electricity board first designated the site at Sizewell for the project. Marshall's chumminess with the minister at the Department of Energy with special responsibility for nuclear energy, Mr Norman Lamont, will help to simplify the timetable. **Robert Walgate**

Large Space Telescope

View from Munich

The contract for the European Coordinating Facility for the Large Space Telescope has been awarded by the European Space Agency (ESA) to the European Southern Observatory (ESO) in Garching, near Munich. The other contenders for the prize were the Royal Observatory at Edinburgh, the Institute of

Soviet second sentences

Dr Andrei Sakharov has this week issued two new appeals to scientific colleagues abroad on behalf of fellow human-rights activists.

The first is on behalf of Aleksandr Bolonkin, a mathematician arrested in 1972 on a charge of disseminating false propaganda — in fact, for having circulated the *samizdat* "Chronicle of Current Events". For this, Mr Bolonkin received a sentence of four years' prison camp and three years' internal exile, while the state Attestation Committee refused to confirm his doctoral degree. After serving his time in camp, and just before the sentence of exile expired, Bolonkin was rearrested and sentenced to a further three years in the camp. Then, a few weeks ago, just ten days before this second sentence was to expire, he was charged again.

Such reconstructions of political prisoners due for release have been frequent in the past two to three years, and many now fear that such a fate may await Dr Sergei Kovalev, whose seven year prison term (on the same charge as Bolonkin) expires next December (to be followed by three years' Siberian exile). Kovalev, whose life is reported to be in danger, is the subject of Sakharov's second appeal, which takes the form of an open letter to Dr Linus Pauling. Included in the appeal are Tanya Osipova, Dr Kovalev's daughter-in-law and a member of the Moscow Helsinki Watch Committee, who was recently sentenced to 5 years labour camp and 5 years exile, and her husband, Ivan Kovalev, against whom it is understood similar charges of subversion are being prepared. Tanya Osipova's plight, says Sakharov, is particularly serious, since she has to serve her sentence in an ordinary criminal camp, whose regular inmates traditionally bully and exploit the political offenders to gain favour with the camp authorities.

Space Astrophysics at Frascati and the Institut d'Astrophysique and the Observatoire de Paris in a joint proposal.

ESO (whose member states are Sweden, Denmark, the Netherlands, Germany, France and Belgium — to be joined by Italy and Switzerland next year) moved last year to the Munich site from Geneva. It manages the observatory at La Silla, Chile, where the main instrument is a 3.6-metre reflector.

There is more than enough room at Garching for the space telescope institute. ESO now operates an imaging processing unit, incorporating a VAX 11/780 computer. Another VAX is to be installed, along with 15 staff members, who will be expected to spend half their time on their own research and half on coordinating the European space telescope observations.

The detailed arrangements for the use of the telescope have yet to be worked out between the US National Aeronautics and Space Administration (NASA) and ESA.

ESA's decision has ruffled several British feathers. The Edinburgh proposal was based on the Starlink image processing system, which also uses the VAX computer and links six British universities. A confidential report by an ESA subcommittee, set up to evaluate the proposals, is said to have highlighted the scientific merits of the British scheme but put it in second place because the location was "far off from most member countries". Problems with pay differentials and apparent weaknesses in management and archiving were also mentioned, but these objections are dismissed by some British astronomers, who consider that a system based on Starlink would provide the best facility for European astronomers. Such a system could, however, be developed with advantage at ESO. **Philip Campbell**

Curien on top

The council of the European Space Agency (ESA) has unanimously elected Professor Hubert Curien, president of the Centre National d'Etudes Spatiales, the French space agency, to be its next chairman. In a break with tradition, the council has also elected two vice-chairmen Dr Harry Atkinson, a British delegate to ESA, and Dr H. Grage, a Danish delegate. The hope is that the three new appointees, who represent separate national interests, will between them steer the agency onto a truly European course as it negotiates its future for the next ten years.

Despite the unanimous vote, however, Professor Curien's election was not without dissent, some delegates fearing that it might give too much weight to French arguments for the further development of the Ariane launcher. Britain had argued that it was time for a British chairman, the last one having been Sir Harrie Massey who chaired the European Space Research Organisation, ESA's predecessor, in the early 1970s. But other countries feared that the possible British candidates would be too partisan. An attempt by Italy and Switzerland to bring John Adams, ex-joint-director of CERN, the European centre for high-energy physics, into the competition failed on the grounds that he is not a delegate to the ESA council. John Adams had declined to apply for the post of ESA's director-general when it became vacant last year.

In the event, the compromise has been to elect the British and Danish vice-chairmen to work with Professor Curien. With the current uncertainty over ESA's future programme, they are bound to play a more vital role than ESA chairmen in the recent past.

Judy Redfearn

US space research

Halley again?

Washington

A faint glimmer of hope that there may, after all, be a mission to Halley's comet filtered from the House of Representatives last week. The House has voted to include \$5 million in the budget to keep the project alive during 1982. But this is less than the \$25 million which scientists at Jet Propulsion Laboratory (JPL) of the National Aeronautics and Space Administration (NASA) say is necessary in the 1982 budget for the first stage of a \$350 million project.

The Republican-dominated Senate in passing a parallel bill last month did not include money for a Halley mission because it had not been requested by the Administration. Even if the proposed mission survives the compromise bill which the two legislative bodies must now negotiate, it still has to go through the appropriations process in which budgets rather than programmes are agreed.

Scientists at JPL are hoping to convince President Ronald Reagan that *not* mounting the mission would be a serious blow to national prestige, given that the European Space Agency (ESA), Japan and the Soviet Union (in partnership with Comecon countries and France) are preparing their own plans.

Dr Ray Heacock, JPL's choice as project manager for the Halley mission, said last week that the \$5 million would be sufficient to fund the project for the first three months of the next fiscal year. After that the President, if the mission is approved during negotiations on the 1983 budget for the agency, could direct NASA to reprogramme some of its 1982 funds.

The proposal has some strong supporters, particularly among those who feel that space science activities in NASA have been unfairly squeezed by the agency's preoccupation with the space shuttle.

The original plans have also been scaled down considerably. NASA had initially talked of a spacecraft which would travel alongside the comet on its way to a rendezvous with the smaller Tempel 2 comet. The latest plans are for a more modest mission using reserve equipment from previous planned missions to launch a spacecraft through the comet's tail within 600 to 1,000 kilometres of the nucleus.

There remains hope, however, that NASA may at least be able to resurrect its full participation in the International Solar Polar Mission, originally planned to fly two spacecraft in complementary orbits over the poles of the Sun. The agency's decision, at the prompting of the Office of Management and Budget, to eliminate funding for one of the spacecraft generated a storm of protest from European allies which are building the other.

The House authorization bill passed last week added \$15 million over the Admini-

stration's request to allow NASA to continue construction of its spacecraft. This decision is likely to be supported in negotiations with Senate counterparts, where astronaut Jack Schmitt is responsible for overseeing NASA programmes. The recommendations from the Appropriations Committee would also permit the project to continue, and given the importance which top State Department officials have attached to maintaining international commitments, it seems unlikely that the Senate Appropriations Committee, which meets to discuss NASA's budget next week, will object.

At the same time, NASA is unlikely to accept ESA's offer to build the second spacecraft, made during the negotiations to salvage the mission. Representative Don Fuqua, chairman of the House Science and Technology Committee, said that he was opposed to this proposal, because it was unfair to expose European contractors to the vagaries of US policy, and because even though the price-tag would be lower, spending the money in Europe would still result in a loss of US jobs and profits. TRW, the company selected by NASA as contractor for its own spacecraft, is now said to have found ways of reducing its costs considerably, a move likely to increase the mission's chances of survival.

David Dickson

Trypanosomiasis

Question of breeding

Schemes for breeding cattle resistant to trypanosomiasis are to be hatched at a research institute being planned in the Gambia (West Africa) with support from international aid agencies and foundations. The objective is to throw light on why N'Dama cattle in Africa appear to be genetically more resistant to infection by trypanosomes (also the infectious agent of African sleeping sickness) than are the more common Zebu cattle, and to find ways of propagating this resistance.

Much of the enthusiasm for the new institute comes from the President of the Gambia, Sir Dawda Kairaba Jawara, who was trained as a veterinary surgeon in Glasgow in the early 1950s, and who became leader of the People's Progressive Party in 1960. A preliminary meeting was held at Bellagio last year, and a meeting in the Gambia in May this year worked out a timetable on which further decisions must be made in time for a final decision about the project by January 1982.

Among international research projects, the Gambian research centre is unusual in that the African Development Bank seems to be prepared to take the lead in providing funds. Other interested parties include the European Community and the British government, the Food and Agriculture Organization and the World Health Organization of the United Nations, and research institutes in the World Bank