US centre for advanced materials

Synchrotron source unwelcome

Washington

THE Reagan Administration's proposal to create a National Center for Advanced Materials (NCAM) at Lawrence Berkeley Laboratory (LBL) has received a chilly reception. Nearly 100 materials scientists have written to the House of Representatives Science and Technology Committee criticizing the proposal and the administration's failure to seek the advice of outside experts before unveiling the plan in the President's 1984 budget.

In response to these criticisms, a House subcommittee chaired by Representative Don Fuqua (Democrat, Florida) has cut $5 million, or about 20 per cent, from the first-year construction budget in order to delay the project and allow for revisions. The subcommittee also found that the administration had "by-passed the preferred review process. . . in its eagerness to move ahead" and ordered that no funds should be set aside for construction until an outside technical review is completed.

The Department of Energy (DoE), which funds LBL and the other national laboratories, has already put together a panel to carry out the review. The chairman is Albert Narath, vice-president for research of Sandia National Laboratory. The other members are drawn from industry, universities and the national laboratories. LBL is also making an effort to smoothe ruffled feathers by sending out 2,000 invitations to a "users' workshop" on the synchrotron Advanced Light Source, the centrepiece of the materials centre.

These belated overtures to the materials research community reflect an apparent miscalculation by George Keyworth, the White House science adviser, who is generally credited with getting the materials centre proposal into the 1984 budget. According to William Brinkman of Bell Laboratories, "this proposal never went though DoE in a conventional way. It went straight to Keyworth's office and was kept under wraps by Keyworth until it went into the budget — without any input from the community."

According to a reliable Washington source, it also went into the budget over the objections of Keyworth's own staff at the Office of Science and Technology Policy.

One of the most outspoken critics of the plan is Rustum Roy, director of the materials research laboratory at Pennsylvania State University. Roy is particularly critical of tieing a materials research centre to the new synchrotron source. "It is a perfectly good physics tool, but to the materials community this would be 99th on a list of 100 priorities", he said. "Its impact on the materials field is zero."

Roy said the emphasis should be on synthesis and processing of new materials — as is the Japanese programme. Although the LBL centre will have one division devoted to synthesis, Roy questioned LBL's expertise. He said a more logical choice would be Oak Ridge National Laboratory.

According to a Fuqua subcommittee staff member, many of the letters from materials scientists also questioned the need for a new synchrotron source. A number also questioned whether materials science is really "big science", centred around big machines, or whether the $174 million for the LBL centre could be more fruitfully spent on the smaller materials laboratories supported by the National Science Foundation.

The first inkling that outsiders had of the NCAM proposal came last September, when the Solid State Sciences Committee of the National Academy of Sciences (NAS) received details on the storage ring of LBL's planned synchrotron. As concern began to grow about the NCAM plan, LBL took some small steps towards involving outsiders. According to Rob Johnson of LBL, the laboratory invited several members of the academy committee and the Council on Chemical Research to sit in on a DoE review of the proposal, held at the laboratory on 10 January. But the visitors did not offer any formal recommendations, and, Johnson admits, "at one time we called it a 'review' and people got very upset".

The first complete public presentation of the proposal came on 8 February, a week after the budget was released, when David Shirley, LBL's director, appeared before the NAS committee in Washington.

Johnson said it was difficult to achieve a consensus among materials scientists in part because "it's hard to define a 'materials scientist' ". And he pointed out that unlike high energy physics and nuclear physics, materials science has no standing advisory panel in DoE that could naturally be called upon to review proposals.

In support of LBL's plan, Johnson pointed to a recent National Academy study which concluded that "the growth in the use of sychrotron radiation has been so great" that existing facilities will meet demand only until 1985. And he said that LBL has received "reams of letters from industrial laboratories saying how enthusiastic they are about the NCAM project".

But such arguments fail to impress critics. Roy said it is standard procedure to canvass support from potential users. "Of course if a vice-president for research gets a letter saying, 'we are going to build a light source, will you use it?' — what is he going to say, 'no'? What they're saying is that if the government puts $140 million into it and we will be charged $100 an hour [to use it] we will like it."

Stephen Budiansky

Power from oil shale

Desert plant

Jerusalem

OIL shale, Israel's only major fossil fuel source, will be exploited by a new company set up with 70 per cent government participation. A wide spectrum conversion plant has been developed at the Casali Institute of Applied Chemistry of the Hebrew University of Jerusalem, and small-scale commercial operation is due to begin this month.

This seems, at first, surprising, since although liquid fuel can be extracted from shales it costs some $60 per barrel, more than twice the current spot market price. The Israeli Ministry of Energy and Infrastructure is, however, willing to support the project, not only as a insurance against the time when world oil stocks begin to run dry, but also because the fluidized bed reactor provides a highly flexible gasification–liquefaction process which can be used either as a source of liquid fuel or as a power source for steam generation.

This flexibility, says Dr Ze'ev Aisenshtat, the team leader, could be an important selling point. The reactor can be used with any particle size from dust to large lumps and any grade of fuel from lowest grade shale to best coal. Although designed for Israeli shales, therefore, it could equally well be used to process the large quantities of low-grade shales in the United States if the Americans decided to exploit these resources.

The development of solid fuel technology became a priority in Israel after the 1974 oil crisis, and during the past five years, with the return of the Alma oil fields to Egypt under the Camp David Agreement and the loss of regular oil supplies from Iran after the Ayatollah's revolution, it became even more imperative to find an alternative to oil for generating electricity. The use of imported coal, however, as in the new Hadera power station, is seen only as a stopgap, and one major advantage of the Casali Institute's reactor is that it could be incorporated into existing solid-fuel power stations with only relatively minor modifications.

Professor Elata, chief scientist at the Ministry of Energy and Infrastructure, says that the shale reactor is only one of a number of energy options that include several specifically Israeli concepts such as solar-pond powered turbines and hydroelectricity generated by the proposed Mediterranean–Dead Sea watercourse. One important spin-off of the route decided for the latter (through the Negev, south of Be'er Sheva) is that it will bring large quantities of seawater close to the site of the shales. Although the Casali reactor has been designed to minimize water consumption, a considerable amount of water would still be necessary for any large-scale use. The construction of the waterway could therefore be linked with the building of power stations to process the shales *in situ*.

Vera Rich

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