British Out of IIASA, Americans May Stay In

Proponents of continued American participation in the International Institute for Applied Systems Analysis (IIASA) are plugging away at finding an alternative to the U.S. government sponsorship that runs out at the end of the year. They are encouraged by the possibility that the American Academy of Arts and Sciences will agree to replace the National Academy of Sciences (NAS) as the U.S. "national member organization" and are seeking to raise money from industry and foundations to pay the U.S. way.

The Reagan Administration last year decided to discontinue federal funding for IIASA (*Science*, 2 April 1982, p. 35), an East-West think tank established near Vienna in the early 1970's in the early glow of détente. When the withdrawal of government support became likely, an IIASA-U.S. Planning Group was formed in this country by those favoring a continued American presence at the institute. The group set out to secure alternative sources of funding and a replacement for the quasi-public NAS, which is bowing out as national member organization.

Approaches to the American Academy were made. Although those involved in the efforts decline to discuss developments until the academy's council has acted, hopes appear to be high that the academy will consent to become the U.S. member.

Founded in 1790, the American Academy is an honorary society with about 2300 members elected from among scholars and national leaders in the sciences, arts, and humanities. The organization, which is headquartered in Boston, publishes the quarterly *Daedalus* and operates an interdisciplinary study center.

Results of the planning group's efforts to raise funds are also currently under wraps. Here too, however, there seems to be optimism that the campaign, headed by former NASA administrator T. Keith Glennan, will be productive in enlisting support from industry and foundations. Chairman of the planning group is Charles Maechling, Jr., a Washington attorney who negotiated the original U.S. membership in IIASA.

IIASA recently received another blow when Britain's Royal Society confirmed that Britain would withdraw from IIASA at the end of the year. The British departure will not impart as serious a financial jolt as that of the United States. Britain is one of 15 "Class B" IIASA members who contribute about $350,000 a year each, while the United States and the Soviet Union have each been contributing some $2.3 million a year to the institute's operating budget of about $10 million.

The official reason given for the British action was a change in research policy at the Department of Environment which has been the source of funds for IIASA membership. There also were reports that influential members and staff of the Royal Society were critical of IIASA's research plan in particular, and less than enthusiastic about applied systems analysis in general.

IIASA is said to be carrying on with assurances of continued backing from the Soviet Union and other member countries, is cutting administrative overhead and research plans to conform to the reduced budget and, figuratively, leaving the gate open to make it easy for the strays to return to the fold.—***John Walsh***

Using Experience to Calculate Nuclear Risks

A new and provocative estimate* of the risks of nuclear plant accidents came to light in early July, the first such analysis to base its findings on the actual record of a decade of industry performance. Earlier work has relied more on probabilistic calculations than on experience.

The new report, called the Accident Sequence Precursor (ASP) study, was written for the Nuclear Regulatory Commission (NRC) by the consulting firm, Science Applications, Inc. An antinuclear lobby, Critical Mass, released a draft of the report over the 4th of July weekend, citing it as evidence that officials have drastically increased their estimates of the risk of an accident.

The report's chief finding is that during the 1970's, the chances for having a Three Mile Island accident were one per 1000 years of reactor operation. At Three Mile Island, the fuel core was partially melted. This contrasts with the official risk estimate published by the NRC in 1974, which said that a fuel core meltdown would occur only once in 20,000 years of operation. The second figure comes from the *Reactor Safety Study* (WASH-1400), prepared for the NRC by Norman Rasmussen of MIT.

The comparison suggests that Rasmussen's work underestimated the real risk by a factor of 20. However, one industry spokesman, David Rossin of the Nuclear Safety Analysis Center, points out that WASH-1400 did not try to estimate the risk of the kind of accident that occurred at Three Mile Island. WASH-1400 looked instead at the chances for a total meltdown, a more severe and presumably rarer event. Rossin says it is wrong to compare WASH-1400 with ASP.

One of the reasons ASP was commissioned was that the NRC was criticized in 1978 for giving so much attention to WASH-1400's probabilistic theory when a better source of information—actual operating experience—was available. One review committee said the NRC ought to make a broad survey of nuclear plant operating records and use these to draw up risk estimates based on general experience.

The ASP report attempts to do this. The authors looked through 19,400 "licensee event reports" sent to the NRC between 1969 and 1979. After sifting through them, the authors identified 169 as "precursors of accident sequences," and 52 as "significant events." Drawing on these cases, they calculated the frequency with which certain accident sequences might occur and the frequency with which safety systems would fail. They concluded that severe core damage of the kind seen at Three Mile Island would occur between 1.7 and 4.5 times per 1000 years of reactor operation. Thus, if 1000 reactors were in operation, there would be at least one severe accident a year. At present there are only 74 commercial reactors in the United States.

*"Precursors to Potential Severe Core Damage Accidents: 1969–1979, a Status Report," by J. W. Minarick and C. A. Kukielka, published by the Nuclear Regulatory Commission (NUREG-CR 2497), June 1982.

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The ASP report did not find any significant difference in failure rates among different brands or types of reactors. It found that about 38 percent of all significant accident precursors involve human error. And it concluded that the WASH-1400 study, although unreliable in predicting large, complex failures, was fairly good in predicting the behavior of individual systems in the plant.

Officials in the NRC's risk analysis division say that while the ASP report is informative, it should be taken with a grain of salt. Many improvements in plant operation have been made since the Three Mile Island accident, and these are not reflected in the ASP data. A later report will look at events that occurred in 1980 and 1981.

—Eliot Marshall

Universities Seek Access to Big Number Crunchers

A group of eastern universities have joined forces to seek a solution to a common problem of lack of access to large-scale computing facilities. The institutions have formed themselves into a Consortium of Universities Concerned About Campus Computing (CU4C).*

Their concern is caused by the universities' inability to purchase state-of-the-art machines or afford commercial time-sharing in the so-called supercomputer category represented by the Cray-I and Cyber 205 computers.

A major aim of the consortium is to win federal support for the establishment of shared facilities for large-scale computing. A heavy initial investment would be necessary and plans call for operating costs to be paid by member universities diverting a percentage of their computing budgets to support of the central facility.

At a time when costs are dropping rapidly at the small end of the computing spectrum, the claim that leading research universities are computationally disadvantaged requires some perspective on conditions in the world of supercomputers.

Supercomputers are defined by their high speed and large memory capacity. As the performance of such machines has soared so has the price. Now, in the main, only national laboratories and industry are able to afford them. Robert McCrory of the University of Rochester, who is chairman of the consortium's interim executive committee, estimates that the cost of a supercomputer well suited for scientific computation would be about $12 million and the total cost of establishing a facility perhaps $16 million. Commercial time-sharing could cost as much as $5,000 to $10,000 an hour.

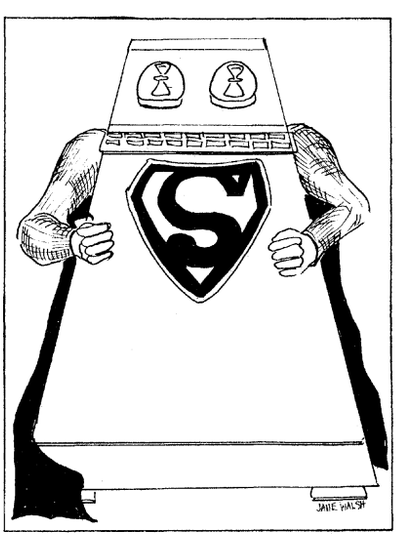
McCrory says that because of the universities' lack of access to such machines academic researchers can no longer compete to investigate important and interesting problems in a growing number of disciplines. Graduate students lack experience with the most advanced computers and require expensive and time-consuming computer education after getting their degrees.

The supercomputers valued for scientific work are particularly adapted to simulating the effects of the movement of fluids. McCrory says that such computers are useful for problems in fluid dynamics in general, in fields such as numerical weather prediction, physical oceanography, and theoretical astrophysics, as well as for studies of reactor safety or for reservoir modeling in petroleum engineering.

The decline in the universities' place in computing dates from the early 1970's. Until then, computer vendors offered universities discounts on mainframe computers, apparently on the theory that graduates would be favorably disposed toward products with which they were familiar. And the federal government through the 1960's had almost automatically underwritten university central computing facilities. Policy then changed on both vendor discounts and federal subsidies for computers. Research universities, unaccustomed to financing big computers, faced the heavy new demand just at a time when university budgets were coming under severe strain.

As a result, American universities lag behind in large-scale computing, McCrory says, while universities in Europe and Japan have long had access to shared facilities. He notes that Britain established centers in London, Manchester, and Edinburgh open to many users. The University of Bochum in Germany is another example of a university base for supercomputer resources. The idea is most advanced in Japan, says McCrory, where a computing center at Tokyo University has some 5000 users and by national policy "gets first crack at everything that's new."

The next step for the consortium, says McCrory, is to put together its own review of university needs. The organizational model favored by the consortium members is the associations formed by universities to enable them to participate in the management and scientific direction of national research facilities such as the major particle accelerators. Federal agencies and Congress, of course, would have to be convinced to create and maintain shared facilities. Those involved in the consortium are encouraged by activities such as a recent workshop on large-scale computing for science and engineering sponsored jointly by the Department of Defense and National Science Foundation and think that the funding agencies will be receptive. Concern about the emerging Japanese challenge in large-scale computers is thought likely to make Congress and the funding agencies willing to help strengthen university computer capacities. The CU4C hopes eventually to see regional facilities established for large-scale computing. Costs of creating such facilities on a national scale are estimated at $100 million over 5 years.***—John Walsh***



Jane Walsh

*Members of the new consortium are Brown, Carnegie-Mellon, City University of New York, Columbia, Cornell, Maryland, Penn State, Rochester, RPI, Rockefeller University, and Woods Hole Oceanographic Institution.