Nuclear Crash

A limited nuclear strike on the United States that used only 1% of the Soviet Union's current arsenal could cause an economic collapse from which recovery would take many decades, according to a computer simulation of the post-attack economy. As a result, a large fraction of the U.S. population would starve to death in the ensuing months—far more than would be killed directly in the attack—and the survivors would probably be "reduced to near-medieval levels of existence for decades," a report on the results of the simulation concludes.

This "nuclear crash," as the authors of the report term it, could be brought about by an attack aimed primarily at destroying the U.S. capacity to produce and import liquid fuels. A total of 85 550-kiloton weapons and 154 200-kiloton weapons aimed at refineries, oil fields, and port facilities would virtually wipe out the liquid fuels sector of the U.S. economy, and with it the capacity to transport food and other commodities, the study suggests. About 8% of the population would be killed outright in such an attack, but almost 60% would die within 2 years.

The computer model used to make these projections was originally developed in the early 1980s by a Cambridge, Massachusetts, consulting firm, Pugh-Roberts Associates, for the Federal Emergency Management Agency (FEMA). According to Edward Roberts, a founder of the firm and a professor at Massachusetts Institute of Technology (MIT), it was developed to investigate the ability of the economy to recover from a relatively large attack. Previous computer simulations had indicated that the economy would recover in about a decade and a half, even from an attack in which as much as 20% of the Soviet Union's nuclear arsenal was used. The Pugh-Roberts model suggested that the economic devastation would be far greater and longer lasting, however. The chief difference was that previous models essentially assumed that the post-attack economy would be in equilibrium; the new one, based on a technique called systems dynamics, attempts to take into account the major dislocations that would result from such a huge shock.

The results, which were delivered to FEMA in 1983, made little public impact at the time. Another MIT professor, Kosta Tsipis of the Program in Science and Technology for International Security, learned of the model and began to work with it to investigate the economic impact of more limited strikes, however. Along with Anjali Sastry and Joseph Romm, Tsipis found that a counter-energy attack would be particularly devastating. The gross national product would plunge to perhaps 25% of the pre-attack level and even after a quarter of a century it would still be hovering below 40% of its peacetime value, the computer simulation indicated.

Tsipis says the findings may even be overoptimistic because some factors that could impede economic recovery were not included in the analysis. For example, the effects of electromagnetic pulse, which could disable much of the U.S. electricity grid and electronic equipment, were not factored in because there was no easy way to quantify them. Similarly, the analysis does not include the psychological impact resulting from the devastation, again because it would be difficult to quantify. "We made as many optimistic assumptions as possible so it wouldn't be attacked as a worst-case analysis," says Tsipis.

FEMA has no formal comment on Tsipis's results. A FEMA spokesman said, however, that the agency had some problems with the original Pugh-Roberts model. He says that when FEMA analysts ran the model using peacetime conditions, it predicted economic failure. Tsipis tested the model under those conditions, however, and he says it performed well. "We have been looking at this model for 4 years, but we do not see any fundamental flaw," he says.

What practical difference does it make to know that economic devastation would result from a relatively small attack? Tsipis argues that both sides could reduce their nuclear arsenals by as much as 95% and still be capable of inflicting "unacceptable damage." He also argues that civil defense measures would do little to protect against the impact of a counter-energy strike. In fact, because of the inability to transport food, civil defense "would probably do little more than preserve more survivors to die of starvation in the long run." Finally, Tsipis contends that "At the root of many of the most poorly conceived ideas and mistaken nuclear strategies [he includes the Strategic Defense Initiative] is the notion that the effects of a few dozen weapons would be 'tolerable'." ■ COLIN NORMAN

Committee Cuts NSF, NASA Funds

The National Science Foundation's $1.89-billion budget request for fiscal year 1988 will be cut by $150 million if a bill approved last week by a House appropriations subcommittee is agreed to by Congress. The reduction, imposed on 12 June by the subcommittee that handles the budgets of the Department of Housing and Urban Development and independent agencies, meets budget goals set earlier this year by the House Budget Committee.

As a result, NSF's total request was reduced to $1.74 billion, and the figure for its research program was cut by $160 million to $1.47 billion. This provides an increase of $69 million over FY 1987, about enough to cover inflation. The subcommittee also increased funding for science education from $115 million to $145 million. Pre-college science education would be funded at $98 million. The balance would go to graduate fellowships and equipment purchases at 4-year colleges.

The appropriations subcommittee also provided $3.5 million for continued use of five supercomputer centers and stipulated that the International Institute for Applied Systems Analysis should receive $1.5 million in funding. The National Security Council blocked an earlier NSF grant to the group (*Science*, 1 May, p. 514).

At first glance, the reduction appears similar to a move made by the subcommittee last year when the House cut money from NSF's request as part of a strategy for extracting other budget concessions from the Senate. It was evident then that the Republican Senate would propose a higher level of spending. But it is unclear whether NSF will fare as well in FY 1988. The size of NSF's budget will depend partly on the support of the often unpredictable William Proxmire (D–WI), chairman of the corresponding appropriations subcommittee in the Senate. Comments one NSF official, "We are not at the point where we know what the Senate is going to do."

The House subcommittee also cut the National Aeronautics and Space Administration's budget by $50 million to $9.43 billion. In contrast, the Environmental Protection Agency's request was hiked to $5.09 billion, $404.4 million above the Administration's proposed budget. Most of the increase would go for pollution abatement and control programs. Funding for the agency's Office of Research and Development would be increased by about $13.1 million. ■ MARK CRAWFORD