

## Project Sanguine Short-Circuited

Under pressure from Capitol Hill and citizens' groups, the Pentagon announced last week that it would rethink its submarine-communications transmitter project, which would have turned much of northern Wisconsin into a giant, electrified grid.

The underground grid was to have been an extremely low frequency radio transmitter used to send missile-firing orders to submerged Polaris submarines, eliminating the need for the craft to surface. The Navy called it Project Sanguine.

Congressmen, led by Senator Gaylord Nelson, and conservationists had contended that heat, ground current, and radiation from the grid would endanger humans and the environment.

The Pentagon last week announced that research breakthroughs had shown that "much smaller, lower power transmitters are possible. Consequently," the announcement continued, "during a further research period, expected to last from 6 months to a year, the Navy will evaluate a number of new potential designs, some of smaller size, some located outside Wisconsin, and some that would cause no more interference problems than present commercial power units and radio transmitters."

Project Sanguine would have required an 800-million-watt power generating installation—probably nuclear-powered. Wires, buried at 3- to 6-mile intervals, would bounce signals of about 45 cycles per second off the Precambrian rock shield that underlies most of northern Wisconsin. The system would cover 22,000 square miles—about 26 counties—and would cost \$1.5 billion. It would be virtually bombproof.

The Navy had said earlier that electrical radiation would be given off by the grid, as well as an indefinite quantity of low-frequency rays and heat, but officials had insisted that a \$175,000 study by Hazelton Laboratories, of Falls Church, Virginia, had shown no bad side effects. Opponents fear that wire fences in the area, which Navy officials have admitted may become charged, will carry sufficient power to kill the soil and expose humans and animals to severe shock and perhaps death.

The State Committee to Stop Sanguine, chaired by Kent Shifferd, professor of history at Northland College, Ashland, Wisconsin, was formed this fall to lobby against the system. Shifferd called the Hazelton report "completely inadequate. No ecological survey of the area was done at all." Scientists from the group will examine the report.

Senator Gaylord Nelson, who was governor of Wisconsin when the project was approved 10 years ago, said he was never informed of it. He favors a serious debate in Congress to prove the necessity of the system. "This is a fundamental issue too important to be left solely to the judgment of the Navy," he said.

An aide to Nelson said that 2 years ago the Navy had begun installing a test facility—with 14-mile-long antennas—in a forest near Clam Lake, Wisconsin. That was when state officials and congressmen learned about the project. Then the Navy conducted public meetings around the state. Newspaper articles—most recently a long article in the *Milwaukee Journal's* Sunday supplement—aroused public opinion.

Wisconsinites made their feelings known to Secretary of Defense Melvin Laird also. Laird had been a congressman from Wisconsin's 7th District from 1952 to 1968. At a meeting last month at Stevens Point, Wisconsin, Laird reportedly was blamed for Project Sanguine.

Representatives Henry Reuss and Robert Kastenmeier and Senator William Proxmire also began to lobby against the project after the Navy had revealed it.

The Navy insisted last week that "under no circumstances" would Sanguine be built unless "it could be built in a manner entirely compatible with its surroundings." Research and development work on Sanguine will continue at a cost this fiscal year of \$20 million (bringing the project's budget so far to \$38 million); the decision on deployment will be postponed until next year.—NANCY GRUCHOW

support for use of these technologies in higher education would hold for alleviating the problems of rising cost of education and student unrest. Even thus simplified, this assessment effort constituted too formidable a task for the NAE study group to complete within the 9 months available. The group was able only to analyze the impact that one of the four federal-funding strategies would have on such things as instructional quality, the problem of coping with poorly prepared students, the "impersonality" of education and the student-faculty relationship, and individualized instruction. A particular impact was characterized as either favorable, unfavorable, or unknown; as likely or unlikely; as controllable or uncontrollable (by manipulation of federal-funding levels). Some 30 pages of the report are devoted to a discussion of the impact of just the one funding strategy that was analyzed.

The report said that to apply only cause-effect methods to technology-initiated studies "produces a mass of data but few broad conclusions." A better approach, it added, is to "organize the assessment effort so as to obtain supplementary contributions of talented individuals or groups who can intuitively perform analysis and evaluation and thus illuminate potential areas of social impact." It emphasized that "creativity and intuition are highly personal" and that choosing the individuals to take part in technology assessment is a matter of fine discrimination, comparable in a sense to selecting the actors for a play.

The report suffers in places from vagueness. Starr told *Science* that it is vitally important for technology-assessment studies to receive wide public exposure—important both from the standpoint of educating the public and of assuring that the scientists, engineers, and other experts who serve on assessment task forces are kept honest and objective. But, while this latter point may be implied in the report, it is nowhere explicitly mentioned.

There are those, of course, who are skeptical of any kind of technology assessment that would have groups drawn largely from a scientific or technological elite deciding or recommending which new technologies the government should promote or discourage. Harold P. Green, professor of law and director of the Law, Science, and Technology Program at the George Washington University National Law Center, is very much of that mind, though he