

Scientists Head for U.S.S.R. to Monitor Bomb Sites

Over the Fourth of July weekend, seven Americans traveled to Moscow to begin an unusual experiment in "citizen diplomacy." The group includes U.S. seismologists who will monitor nuclear test shocks—or the absence of them—at three sites in the Soviet Union and three in the United States. This unprecedented project is sponsored jointly by the Soviet government and the Natural Resources Defense Council (NRDC), a private environmental group headquartered in New York (*Science*, 13 June, p. 1338).



Semipalatinsk: Soviet bomb test site will be monitored by U.S. and Soviet seismologists.

"A friend said I should tell you this is a big deal," declared NRDC's executive director John Adams at a press conference jammed with photographers on 30 June. "It is a big deal," he said, explaining that the organization is trying to raise \$1.3 million to finance its end of the agreement for the first year. According to Adams, the Carnegie Corporation of New York and the John D. and Catherine T. MacArthur Foundation of Chicago have pledged support, as have several individuals and smaller philanthropies. The Soviet Union will provide travel and living expenses, both for their scientists who come to the United States and for Americans in the U.S.S.R. The Soviets also plan to buy and keep the seismic monitoring equipment, if the U.S. government permits.

The NRDC's project manager and the initiator of the exchange, Thomas Cochran, leads a team that will make preliminary site selections in the U.S.S.R. this month. The team's technical director is Charles Archambeau, professor of geophysics at the University of Colorado's Cooperative Institute for Research in Environmental Sciences. Other members include James Brune, Paul Bodin, and David Carrel of the Scripps Institute of Oceanography at La Jolla; Keith Priestley of the University of Nevada at Reno; and Bryan Tucker, a consultant in Soviet seismology.

The first task is to install some surface

seismic monitors. The Department of Commerce granted an export license for these relatively simple devices just 6 days after the application was filed. "It must be a record," Cochran said. The NRDC will set up the first monitoring station near the Semipalatinsk bomb testing area, Cochran said, because in the past it was the busiest center. However, it is not clear when or whether the U.S. team will observe any nuclear shocks, for the Soviets have extended a moratorium on bomb tests at least through 5 August.

Deciding where to place the instruments is complicated by the fact that foreigners have not been in this area before and there are no data to review. "I'd like to look at aerial photos," Bodin said, "but we don't know yet what they're going to show us."

While the surface monitors are being installed, more sensitive equipment is being ordered for use in holes to be drilled 100 to 200 kilometers from test sites near Semipalatinsk and Reno, Nevada. The NRDC has not yet sought an export license for this equipment, which may contain unique digital components. Once the sites in the Soviet Union are ready, duplicate versions will be set up in Nevada. Archambeau said that both operations, manned jointly by U.S. and Soviet scientists, should be running by the end of October. The data collected will be turned over to all interested researchers, including the U.S. Department of Defense. ■ **ELIOT MARSHALL**

Air Force Determines Potential Cause of Titan Rocket Explosion

After a 2-month investigation, the U.S. Air Force remains uncertain exactly why a \$65-million Titan 34D rocket exploded just 9 seconds after leaving a launch pad last April. But a team of investigators has formed a plausible hypothesis, involving some faulty workmanship, that might cause only a slight delay in the military space program.

According to an interim report, presented to reporters by Brigadier General Nathan Lindsay on 2 July, the accident began with an explosion of one of the rocket's 11 motor casings, which inadvertently set off a self-destruct mechanism and simultaneously ignited a large tank of liquid fuel. The cause of the explosion presently considered "most probable" is a gap between the casing's rubber insulation and its steel wall, which somehow remained undetected during numerous ultrasonic and x-ray tests conducted over a 5-year period.

Lindsay, who is a former commander of the Eastern Space and Missile Center in Cocoa Beach, Florida, explained that this gap probably allowed hot gases to erode the inside of the wall by roughly three-sixteenths of an inch, to a point where it was incapable of sustaining the normal operating pressures of 700 pounds per square inch. The resulting breakup of the missile destroyed its payload, believed to be a reconnaissance satellite costing hundreds of millions of dollars, and caused roughly \$70 million in damage to the pad itself.

Asked why the gap escaped detection, Lindsay said "that is probably a question that I'll never be able to exactly answer." But he stressed that new inspection techniques would be developed and applied to the six remaining Titan 34D's before any of them would be launched. In addition, a series of tests will be conducted with spare parts to try to replicate the accident. "That would then give us the final confidence that we have found the precise cause, and then we can proceed with the particular fixes and improvements," Lindsay said.

He predicted that these tests and repairs will take only a few months, enabling the next launch to occur "early next year." At present, he feels "confident that [the] mission areas that we rely upon space systems for [that is, communications and intelligence-gathering] are being handled well. . . . There's obviously some concern about all the contingencies that might ever happen over the next 6 to 8 months, but I feel these vehicles will be back flying in a timely manner."

Lindsay did not provide many details, but he acknowledged that the accident findings could also affect the space shuttle, which uses similar solid-fueled rockets. "There are similar bonding techniques. There are similar materials," he said. "We've made this information available" to the National Aeronautics and Space Administration, and "I would believe that they would do an exhaustive review and audit of their insulation materials." ■ **R. JEFFREY SMITH**

Health Service Unveils Fraud Policy

The Public Health Service (PHS), after 4 years of preparation, has announced a formal policy for dealing with cases of scientific fraud and misconduct.

The policy was inspired by the rash of cases of scientific misconduct that received wide publicity in the early 1980's, particularly that of Harvard researcher John Dar-see.