know the microgravity program exists," says Peter Voorhees, chair of the panel and a materials researcher at Northwestern University in Evanston, Illinois.

The report appears to contradict one released in July that strongly emphasized biology and applied materials research such as combustion and de-emphasized fundamental physics. That panel, formed by NASA Administrator Sean O'Keefe and chaired by Columbia University endocrinologist Rae Silver, triggered dissents by several physical scientists on the panel who complained that their views had not been taken seriously (*Science*, 19 July, p. 316). "The conclusion of the [Silver report] is what biologists think, not what physical scientists think," says Voorhees.

NASA officials say that physical scientists have overreacted to the Silver report. "We have very good opportunities coming up," notes Trinh, pointing out that physical scientists have been given about half the experiment slots on the station (and another 20% or so for commercial materials work). Trinh insists that there are no contradictions between the NRC study, which dealt with detailed research areas, and the Silver report, which covered the entire range of science. **–ANDREW LAWLER**

SEISMOLOGY

## Whole Lotta Shakin' in Alaska, as Predicted

Predicting anything about earthquakes is fraught with uncertainty today, but 30 years ago it was a nightmare. So seismologists at the U.S. Geological Survey (USGS) found themselves out on a limb in the early 1970s when they insisted that a quake could shake the proposed trans-Alaska oil pipeline far more violently than engineers were assuming. Eventually, the seismologists got their way, and the pipeline was engineered to be more quake-resistant. Last week's temblor—the most powerful ever known to occur on U.S. soil—cut right beneath the pipeline, justifying the seismologists' concerns. And the engineering paid off: Not a drop was spilled.

"I'm pleased the whole process led to a successful project," says seismologist Robert Page of USGS in Menlo Park, California, who was involved in setting standards for the pipeline. "It's an example of how science can help reduce natural-hazard risks to society."

In the early '70s, it was obvious that there would be risks involved in pumping a couple of million barrels of oil a day down a 1280-kilometer pipe across some of the wildest country in the world. Drawing primarily on skimpy geological evidence and one large earthquake that struck the region in 1912, USGS seismologists inferred that the Denali fault—which sliced across the proposed pipeline route in central Alaska—could unleash a magnitude 8.0 quake. Not a bad estimate: Last week's temblor measured 7.9.

But the contentious issue between USGS seismologists and some engineers in the debate over the pipeline's potential environmental impact was how strongly such a quake would shake the ground near the fault. Seismologists had just gotten their best measurements yet of ground shaking anywhere near a large, rupturing fault during the 1971 San Fernando earthquake in California. The results were sobering. "All I knew was that the ground was shaking harder than the earthquake engineers had been expecting," says Page. Whether a Denali quake would work the same way and severely test conventional designs remained in contention; at stake was an $8 billion project—the world's largest privately funded project at the time—as well as the design standards for nuclear power plants on the seismically hazardous West Coast. But in the end, USGS seismologists were allowed to set a demanding seismic standard for the pipeline, and engineers designed kinks into the pipe so it could compress, extend, and slide sideways on Teflon-coated pads without failing.

And survive it did. The pipe crossing the fault slid to the edge of its crossbeams—as intended—and slipped off at only one spot. Some supports failed, but the pipe held. Oil was flowing again after 3 days of inspection and shoring up. "It worked," says earthquake engineering geologist Lloyd Cluff of Pacific Gas & Electric in San Francisco, who helped develop the final pipeline design. Page and USGS were right to stand by their science, he says; a basic scientific understanding of a fault combined with appropriately conservative engineering can accommodate even the uncertainties of 3 decades ago. **–RICHARD A. KERR**

**Not a drop.** The quake on the Denali fault, which broke through the highway at lower left, could not rupture the trans-Alaska oil pipeline.

CREDIT: ROD COMBELLICK/ALASKA DIVISION OF GEOLOGICAL AND GEOPHYSICAL SURVEYS

HUMAN CLONING

## U.N. Split Over Full or Partial Cloning Ban

Efforts to craft an international ban on human cloning stalled last week in the United Nations when 37 countries, including the United States and Spain, refused to support a proposal they said was too narrow. That proposal, sponsored by France, Germany, and 20 other countries, would have banned just reproductive cloning: efforts to implant cloned embryos into surrogate mothers and allow them to develop to term. The United States and its allies said they would support only a measure that banned all forms of human cloning, including so-called research cloning.

Scientists are in almost unanimous agreement that human reproductive cloning is not only morally questionable but also dangerous for both surrogate mother and potential child. But some argue that research cloning, in which cloned human embryos might be used to produce embryonic stem (ES) cells, could be a boon to medicine. The resulting ES cells could be used to study genetic diseases or—eventually—treat sick patients. Opponents of embryo research argue that such experiments create human life only to destroy it.

France and Germany announced 2 years ago that they wanted to craft a ban in the United Nations to block the efforts of some fringe groups to create cloned children. But that proposal ran into opposition from the United States, which offered its own alternative, a convention banning all cloning of human embryos. French and German diplomats argued that opinions varied so much that negotiating a complete ban would take too long. They pushed for an immediate ban on reproductive cloning while leaving open the possibility of eventually hammering out a broader ban.

The U.N. committee in charge of international law was unable to reach a consensus on whether to support a complete or partial ban and decided on 8 October to postpone any further debate on the subject until next fall. A meeting to discuss the issue further is planned in South Korea next spring.

In a statement, France and Germany said the failure to move forward on a ban on reproductive cloning "leaves the field open to those working toward giving birth to a cloned human being." A spokesperson for the German mission to the U.N. says his country supports the idea of a ban on all cloning experiments but believes a ban on reproductive cloning is a more realistic goal. "It's more a difference in how to proceed," he says. "In our domestic legislation we have prohibited all forms of cloning. On the other hand, we didn't see a chance to pass that here."

Research cloning is expressly legal in