radiation detectors, while the Arzamas researchers provided the software for it. Los Alamos added gamma ray and neutron detectors and data analysis programs for measuring plutonium isotopic composition, while the Arzamas scientists provided a "passport system" that records a radiation signature for a given radioactive item that can then be checked at any later time to make sure that it hasn't been processed to extract fissile material.

Throughout the spring, the researchers will be holding workshops to teach the technology and philosophy of modern MPC&A systems to Russian operators. The next step, says Augustson, is to take the equipment from the demonstration facility and put it into real facilities: "We want to go through certification that this equipment will really work before we put it into routine use." Meanwhile, Sandia researchers and collaborators from the five other labs have helped upgrade the physical protection at a test reactor at the Kurchatov Institute and safeguard nuclear material, says Younger, that "was previously, it's safe to say, at risk" and now is not.

Paying their way

These interactions have been so successful that the Department of Energy has allocated $15 million for nuclear material control through the lab-to-lab interactions and expects to expand that to $40 million in fiscal year 1996. No money has been allocated beyond this year to continue the non-nuclear collaborations, however. The U.S. researchers will have to pay their own way through discretionary funds in the laboratories, while hoping their Russian colleagues can get funding through the International Science and Technology Center (see box on p. 489), which is supported by the State Department.

Participants from the national laboratories are optimistic about the progress on the safeguard systems, but they caution that the ultimate success of the systems will largely be determined by the Russians. Right now, says Younger, "the Russians have proposed moving further and faster than the Americans can keep up with." But T. R. Koncher, who coordinates programs at Livermore related to the former Soviet Union, notes: "We can build the infrastructure, [but] the Russians are still the ones that are going to really have to implement it at their operating facilities."

Researchers involved in the collaborations are also keeping a wary eye on Washington. Until recently, the national laboratories have been very quiet about the collaborations. They worried about offending the Russians on one side, and about attracting the attention of U.S. politicians who may look askance at U.S. tax dollars supporting Russian weapons scientists, even in a good cause. Now that the collaborations are beginning to get some publicity, Younger says: "I live in constant fear that somebody in the government—and there are a huge number of people in the government who think they're responsible for interactions with Russia—will say 'Stop.' "

–Gary Taubes

OPTICAL ASTRONOMY

ESO and Chile Begin to Clear the Air

European astronomers must sometimes rue the fact that some of the best conditions anywhere in the world for ground-based optical astronomy happen to be in Chile. The eight-nation European Southern Observatory (ESO), lured by the clear air of the arid Atacama desert in northern Chile, has built 14 telescopes there since the 1960s, and it is now constructing its most ambitious project so far in the same area: the Very Large Telescope (VLT), a set of four 8-meter instruments that will operate together as if they were a single 16-meter telescope. But politically, the skies over ESO's new venture have been far from cloudless; in fact, they have been downright stormy. A series of squabbles, ranging from labor disputes to land claims, escalated last month to a full-blown crisis when a Chilean court official and police forced their way into ESO's offices at the VLT site, confiscated papers, and demanded that construction be halted pending a legal challenge to ESO's ownership of the land.

The incident may, however, finally lead to a clearing of the air. ESO, claiming that the move violated international law, put heavy diplomatic pressure on Chile to sign a new agreement that confirms the legal status of the VLT project while meeting longstanding concerns of local workers and astronomers. The agreement, which was signed last week at ESO headquarters in Garching, Germany, does not resolve the legal dispute over ownership of the VLT site, but ESO officials hope it will pave the way for a settlement. "It's not the end, but it is a turning point," says ESO Council Chair Peter Creola, an official in Switzerland's Federal Department of Foreign Affairs.

The agreement, which now goes to the Chilean Congress and ESO's Council (*Science*, 21 April, p. 355), is meant to put to rest issues that have festered ever since ESO decided in the 1980s to build the VLT in Chile. In 1988, the Chilean government, then a military dictatorship, gave ESO the site on Cerro Paranal, some 650 kilometers from its main observatory at La Silla. The government also declared, in an exchange of letters with ESO, that privileges ESO had enjoyed at La Silla under an agreement signed in 1963 were extended to the entire country. These privileges, which are common to most international organizations such as the United Nations and CERN, include immunity from the taxes and laws of the host country.

When democracy was restored in 1990, however, some groups in the country felt that Chile had gained little from the deal. Local astronomers wanted a guaranteed share of observing times, Chilean workers at La Silla demanded better union representations, and some politicians claimed that the donation of the Paranal site was not legal. The situation went from bad to worse when descendants of 18th-century war hero Admiral Juan Latorre claimed that they owned some of the Paranal land and filed suits against both the government and ESO.

To resolve some of these problems, ESO has been trying for several years to negotiate a supplementary agreement with Chile to make the extension of the 1963 convention to the rest of the country more legally watertight—a move that would effectively shield the organization from the suit filed by the Latorre family. In return, the new agreement would guarantee Chilean astronomers 10% of the observing time on all of ESO's telescopes in the country and incorporate Chilean labor law into work practices at both observatories. Last summer, with the top of Paranal leveled off and ready for construction but the supplementary agreement not finished, ESO decided to go ahead and ship the first parts of the telescopes from Europe to Chile (*Science*, 19 August 1994, p. 1026). That bold move seemed justified when, in November, a draft of the agreement was finally completed. "We were led to believe signing and ratification would follow quickly," says ESO spokesperson Richard West.

Events did not go so smoothly, however. "There were lots and lots of postponements," says Creola. "The government wanted to be sure of support in Congress, but there was some animosity toward ESO because of the

ESO

Flat top. The Very Large Telescope site at Paranal.

land dispute." ESO's member countries then began to apply pressure: Their ambassadors in Santiago petitioned the government, and in mid-March, when Chilean President Eduardo Frei toured Europe, the issue of ESO was raised repeatedly in various capitals.

Back in Chile, however, the situation began to deteriorate rapidly. On 20 March, the court hearing the land dispute ordered ESO to halt construction work until the case was settled. This decision was backed up by the national Supreme Court on 28 March, but ESO insisted it was a domestic issue between the Latorre family and the government and refused to stop work.

The culmination came on 30 March, with the forced entry at Paranal. "This act raises to a new level the quality of harassment to its activity in Chile," ESO said in a statement. "The intervention ... at Paranal created much concern in the European member states," says ESO Director General Riccardo Giacconi, "and it brought it to the attention of higher authorities in Chile. The problem had to be solved." Creola says that at this point Chilean parliamentarians realized that their opposition was damaging international relations and signaled that the supplementary agreement should go ahead.

On 18 April, the agreement was signed in Garching, and tensions began abating at once. According to West, court officials were due to visit Paranal a second time on that day but did not show up. The next day, some VLT equipment that was being held up in a Chilean port was released "by direct action of the government," says West. According to Creola, the government has now begun negotiating with the Latorre family's lawyers with a view to compensation for the land. "The government is solidly behind us. It is honestly trying to solve the problem," he says.

ESO is not out of the woods yet, however. The Chilean Congress must still ratify the agreement. "There will be some strong discussions, but it will be difficult to say no," predicts University of Chile astronomer Claudio Anguita. But some doubt still remains over ESO's immunity in the whole of Chile. The Chilean government insists that the original exchange of letters sealed the extension, and hence the supplementary agreement only "confirms" it. However, some Chilean politicians still maintain that the extension by the military government was not legal. According to Enrique D'Etigny, president of Chile's National Commission for Science and Technology, the Supreme Court has said that once the ownership of Paranal is settled, it will then consider whether the extension of the immunity was legal.

The ESO Council is due to meet again in June and will reassess the situation then. A working group set up last summer will report on possible alternative sites for the VLT should the worst happen. For the past year, ESO has had a "seeing monitor" installed on a mountain called Gamsberg in Namibia to assess the viewing conditions there. ESO, however, remains committed to Chile. Says Giacconi: "We are putting together the best array of telescopes in the world. This deserves the best place in the world, and Paranal is certainly that."

–Daniel Clery

BIOETHICS

U.K. Panel Weighs Tissue Ownership

A working group of seven British medical and legal experts issued a report* last week that attempts to settle a vexed legal and ethical question: Who owns a sample of human tissue once it has been removed from a patient's body? Its conclusion: A patient has no claim on such tissue, but to protect patients from having tissue removed for commercial use, the report recommends that the organizations that remove it and store it—hospitals and tissue banks—should not be allowed to "deal" in tissue for profit. The working group, which reported on behalf of the Nuffield Council on Bioethics—an independent body that has, by default, become the United Kingdom's national bioethics committee—is hoping that its report will provide a comprehensive ethical framework for biotechnology using human cells and organs.

Much of the debate over the ownership of human tissue was sparked off by the case of John Moore, a Californian who survived leukemia and later found that researchers at the University of California, Los Angeles, Medical Center had established an immortalized cell line, which secretes large quantities of valuable immunostimulatory proteins, from white blood cells removed from him during treatment. The university patented the work and licensed it to drug companies, which are now using it for commercial production. Moore sued the University of California in 1984, but the California Supreme Court ruled that he had no property rights to cells taken from his body. The court did rule, however, that the doctors had not obtained Moore's informed consent to use the cells, nor had they told him of its potential value—a point which was later settled out of court.

The Nuffield panel, which was headed by Rosalinde Hurley, professor of microbiology at London's Royal Postgraduate Medical School, recommends that a similar legal position be adopted in the United Kingdom. "We've followed the long-standing principle that you're giving away the tissue for the greater good [of humankind]," says council Chair Patrick Nairne. But the panel didn't stop there: It sought to cut through the tangle of legal precedents by setting down comprehensive guidelines for future court cases. "Any recent legal provisions ... for example in relation to the donation, sale, or transplantation of organs, have been directed at specific problems; ... [therefore] the result is a very piecemeal legal framework," says Graeme Laurie of the University of Glasgow's Institute of Law and Ethics in Medicine.

"We followed the principle that you're giving away the tissue for the greater good."

—Patrick Nairne

The first of these guidelines is that removing human tissue specifically for commercial gain is unethical, and human tissue should not be treated as a commodity. To guard against a trade in tissue, the report recommends that donors should only ever be paid for expenses, not paid a fee, and that the institutions responsible for removing and storing human tissue must work on a noncommercial basis; they would then act as a buffer between patients and commercial organizations that might wish to use the tissue.

Although the report also recommends that donors have no rights to their tissue once removed, it emphasizes that doctors must fully inform them of its intended uses and the risks they are taking in donating it. And the report stipulates that the only ethically acceptable uses for human tissue are those that contribute to medical research, treatment, or education—any uses that "destroy, damage or degrade" are unacceptable. "The report is unique in that it adopts a particular ethical stance ... from which to approach any problem concerning human tissue," says Laurie.

Although the report is likely to be influential, the council has no power over public policy. The Nuffield Foundation, which promotes science education, established the Council on Bioethics in 1991 as an independent advisory committee because the British government had no body of its own keeping an eye on bioethics.

–Claire O'Brien

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* "Human Tissue: Ethical and Legal Issues," Nuffield Council on Bioethics, 28 Bedford Square, London WC1B 3EG, U.K.