

Panel Tells E.U. It Could Go ITER Way

CAMBRIDGE, U.K., AND BARCELONA, SPAIN—As the horse-trading to select a site for the International Thermonuclear Experimental Reactor (ITER) has been heating up, an eagerly awaited report has weighed in on the merits of the two European sites vying to host the \$5 billion facility. Although the panel didn't pick a winner, it told European Union (E.U.) leaders that the choice boils down to possibly saving money or opting for experience.

Competition is fierce to host ITER, which will aim to show that generating power through nuclear fusion is a practical proposi-

tion. ITER partner countries have been studying four candidate sites, in Canada, Japan, France, and Spain.

To boost its odds, the E.U. decided to put forward only one candidate—either Cadarache in France or Vandellòs in Spain—and asked David King, chief scientific adviser to the U.K. government, to head a committee to assess the sites. In a report sent to the E.U. last week, the panel concluded that either site would be “a very strong contender.” The officials who make the final selection, King told *Science*, must decide

whether they want a virgin site likely to have lower costs or a site with established nuclear research expertise on hand if it's needed.

In Cadarache's favor, the research center, run by France's Atomic Energy Commission (CEA), is home to an experimental fusion reactor called Tore Supra. “No one has ever questioned the quality of the expertise at Cadarache which would help to guarantee against increasing costs,” says Paul Vandeplass of Belgium's Royal Military Academy, acting chair of the consultative committee of the E.U.'s Euratom fusion program. But a potential drawback, King says,

is that France's research budget is stagnant and the government has promised no new money for ITER. Putting it in France, therefore, could kill Tore Supra. “This could put pressure on the fusion research community,” says King.

Vandellòs, meanwhile, is home to a commercial nuclear power station but has no research facilities or fusion experience. Its main advantage is an attractive price tag: Although much ▶



Fusion hot spots. Artist conceptions of ITER facilities at Cadarache (left) and Vandellòs.

POLYGRAPH TESTING

DOE Says Fewer Workers Will Face the Machine

Bowing to mounting criticism, the Department of Energy (DOE) will curtail its use of polygraph tests among nuclear weapons scientists and security officials. Last week DOE Undersecretary Kyle McSlarrow told a Senate panel that the agency will shrink the potential pool of employees required to take lie detector tests from about 20,000 to 4600. But critics say the government is still putting too much faith in a device that has little scientific credibility.

DOE “cannot continue to hinge the careers of scientists on voodoo science, no matter how few or great the number,” says Representative Ellen Tauscher (R-CA), whose district includes Lawrence Livermore National Laboratory.

Polygraph machines monitor subjects' blood pressure, pulse, respiration, and skin conductivity as they answer questions. Advocates say the machine can tell if someone is lying. The U.S. government has long required polygraph tests for scientists, soldiers, and spies who handle sensitive information, even though most courts bar the

results from trials because of doubts about reliability. Spy scandals at Los Alamos National Laboratory in New Mexico in the late 1990s led DOE to expand its polygraph program, despite widespread opposition from researchers.

DOE is now having second thoughts about policies it adopted earlier this year, McSlarrow told the Senate Committee on Energy and Natural Resources on 4 September. One factor is a recent report from the U.S. National Academy of Sciences (NAS) that found polygraphs were bound to produce faulty results and could give counterintelligence officials a false sense of security (*Science*, 25 April, p. 577). “I found many of the NAS's concerns about the ‘validity’ of polygraph testing to be well taken,” McSlarrow said in outlining the revised plan, which will cover an estimated 4600 employees with access to the most sensitive weapons and intelligence information. “This category will not include everyone with a ‘Q’ or a Top Secret clearance, nor will it include all weapons scientists,” he noted. In addition, the agency

will conduct random tests among about 6000 other employees. McSlarrow also emphasized that failing a single test wouldn't be grounds for dismissal, although it would trigger a broader investigation. “This is a smart decision by DOE,” says Senator Pete Domenici (R-NM), a polygraph critic.

McSlarrow expects the latest plan to be available for public comment by the end of the year. But the shift may not actually cut DOE's current use of polygraphs, warns Jeffrey Colvin, a physicist at Livermore and a leader of the Society of Professional Scientists and Engineers, a union opposed to testing. The department has never tested all potential candidates, he says, so the switch could simply codify the current program.

Steven Aftergood of the Federation of American Scientists in Washington, D.C., questions the usefulness of the new random testing program. “It is sort of a homeopathic approach to security policy,” he says, “in which the mere specter of a polygraph test ... is believed to have a deterrent effect.”

—DAVID MALAKOFF

CREDITS: ITER

of ITER's hardware will be provided by member states, King says that current large construction projects cost two-thirds as much in Spain as in France, and the difference is unlikely to change much in the next few years. Jean Jacquinot, head of France's CEA-Euratom fusion program, rejects this conclusion. "I don't believe for a second there will be a big difference in cost," he says.

Another selling point for Vandellòs, howev-

er, is that Spain's research budget was recently hiked by 7.9% annually, and the government has pledged to find new money for ITER and maintain a national program based around stellarators, fusion reactors that use an alternative method of magnetic confinement. Carlos Alejaladre, director of Madrid's National Laboratory for Fusion by Magnetic Confinement, says the Spanish fusion community relishes its new-kid-on-the-block status: "In a way, we are

challenging the 'natural order' in Europe."

French and Spanish fusion researchers won't have to wait long to hear if their bids have been successful. E.U. ministers will meet later this month to select a single candidate. By the end of December, that site or one in Canada or Japan will be declared the future home to the world's biggest fusion reactor.

—DANIEL CLERY AND XAVIER BOSCH

Xavier Bosch is a science writer in Barcelona.

MEDICINE

Sugary Cloak Protects Platelets From the Cold

Tackling a problem that hematologists and blood banks long ago gave up on, a team of scientists has determined how to store platelets in the refrigerator instead of at room temperature, as is done today. If upheld in further experiments, the technique could stabilize platelet supplies and reduce the risk of bacterial infections from transfusions.

Platelets are disk-shaped cells that help blood clot. Each year millions of units are transfused into people around the world to stem bleeding. Recipients include cancer patients, whose treatment impairs platelet production, as well as people undergoing major surgeries. But because platelets must be stored at warm temperatures, they last only 5 days after donation, and they can foster bacteria that are a leading cause of transfusion-borne infection.

Harvard scientists Thomas Stossel, Karin Hoffmeister, and their colleagues sought to bring platelet storage more in line with that of other blood components. Red blood cells can be refrigerated for more than a month, and plasma can be frozen for a full year. But when doctors began infusing platelets into leukemia patients in the 1960s, they quickly discovered that chilling them prompted the cells to disappear soon after a patient received them. Efforts to remedy the problem failed, and "people had pretty much given up" trying to refrigerate platelets, says Edward Snyder, director of the blood transfusion service at Yale–New Haven Hospital in Connecticut.

Stossel's team has spent the better part of a decade exploring why platelets don't tolerate the cold. In January, the researchers found an answer and began working toward a remedy. In the journal *Cell*, they reported that when platelets are chilled, certain protein receptors on their surfaces clump together. That triggers a reaction from certain liver cells: When the platelets are infused, the liver cells yank them out of the bloodstream.

Now, as reported on page 1531, the re-

searchers have figured out how to prevent the liver from recognizing these clumped receptors. Experiments in test tubes indicated that when platelets are chilled, a sugar molecule on the receptors' surface becomes more exposed. The scientists reasoned that if they threw a cloak over the sugar—in the form of another kind of sugar molecule that covers up the first—the platelets would circulate freely.

Hoffmeister and colleagues extracted platelets from the blood of mice, mixed them with a solution containing the second sugar, and refrigerated the concoction for 2 hours. They then injected the modified platelets into

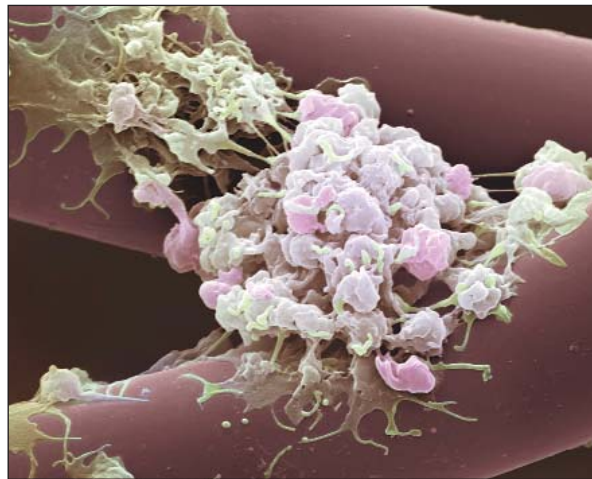
of components development for the National Blood Service of England. The discovery comes at a time when countries are increasingly concerned about infections in platelet recipients. Last fall, two patients contracted *Salmonella* from a transfusion; one later died. Both infections were traced to a single donor who had the bacteria on his skin as a result of handling his pet snake. Roughly one in every 1500 units of platelets harbors bacteria, and it's not known how many of these cause harm to patients.

In an attempt to reduce infections, the American Association of Blood Banks has decreed that by 1 March 2004, blood banks must test every platelet unit for bacteria. Such testing is already performed in Belgium and the Netherlands. But testing takes 2 days. This means centers must either lengthen the time platelets are stored or distribute them within 3 days.

Several companies are developing techniques to eliminate pathogens from platelets and other blood components. One system for zapping bacteria and viruses, developed by Cerus Corp. in Concord, California, has been approved in Europe. But it can boost the cost of platelets by 50%, says Hans Gulliksson, director of transfusion medicine at Huddinge University Hospital in Stockholm, Sweden.

Concerns about these new approaches explain the enthusiasm some express for simply putting platelets in the fridge. That "seems to offer real promise" not only for reducing pathogens but also for extending storage time, says Roger Dodd, executive director of biomedical safety for the American Red Cross in Rockville, Maryland. The National Blood Data Resource Center in Bethesda, Maryland, estimates that in 2001, \$100 million worth of platelets in the United States were discarded. After more expansive testing, refrigerating modified cells may allow blood banks—and recipients—to start counting their savings.

—JENNIFER COUZIN



Patchwork. A minor modification might allow refrigerated platelets to keep clotting once transfused.

mice, and the cells seemed none the worse for wear. "After 24 hours, the number of platelets is essentially the same" as the number originally transfused, says Stossel, suggesting that the cells weren't being cleared from the bloodstream. The group also studied human platelets with a similar sugary disguise. After chilling the platelets for up to 12 days and then examining them in a test tube, Stossel's team found that their function seemed intact.

"It's very exciting to think that we may be able to store platelets in the cold," which would kill bacteria or prevent them from proliferating, says Rebecca Cardigan, head