environmental impact. After its approval by the federal Environmental Protection Agency, the AGS experiment was reviewed by officials in the state government, who granted permission pending a 45-day period for public comment. The Lindow proposal got a favorable state final environmental impact report and awaits approval by officials within the University of California system. Public comments on the report were reviewed in early February, and the University seemed likely to give Lindow the green light in mid March. Bets are still being placed as to which experiment will start first.

California's coordinated regulatory framework draws extensively from the similar exercise going on within the federal government. Although there are few surprises in the state's version, it could become a model for other state and local governments as they try to clarify their own approaches to biotech products.

In California, 11 state regulatory agencies deal with biotechnology issues of one sort or another, according to Wesley Ervin, project coordinator for biotechnology in the office of business development at California's Department of Commerce. Information about their jurisdictions, pertinent regulatory authorities, and categories of potential products for review was combined in a matrix to guide members of biotechnology companies and other researchers. A descriptive handbook also explains these overlapping and parallel jurisdictions. In many instances, Ervin says, the role of a state regulatory agency closely parallels that of a federal body—and often its standards are equal to, or stricter than, federal rules.

Little has been done so far to adjust overlaps in the California agencies' authority, and the state has not enacted any additional laws to regulate biotechnology. In some cases, however, rules were modified to ensure that permit procedures would provide "adequate public notification."

The handbook itself went through several drafts, but the effort concentrated on clarifying the regulations and describing current statutes without making any proposals for new rules. "We have no experience yet regulating biotechnology products, and even the federal regulatory framework has not solidified. We intend to keep looking at what the federal government does to see whether changes are in order here," Ervin says. The state also plans to sponsor efforts to improve public understanding of biotechnology.

—Jeffrey L. Fox

RESEARCH REGULATION

RAC TO REVIEW GENE THERAPY, NOT DELIBERATE RELEASE

WASHINGTON, D.C.—For the Recombinant DNA Advisory Committee of the National Institutes of Health (NIHRAC), defining deliberate, or "planned," release of genetically engineered organisms into the environment has become somewhat of a symbolic issue. At its February meeting, the committee urged a further easing on current restrictions, a maneuver that can succeed only if the other federal agencies evaluating actual plans for such experiments follow NIH's intellectual lead.

In another action, the committee reaffirmed its intent to evaluate plans for human gene therapy experiments—work that also falls under Food and Drug Administration (FDA) jurisdiction. This is despite NIHRAC's decision to limit its role in reviewing recombinant DNA proposals that go before other federal agencies. In addition, the committee endorsed an FDA recommendation that it ease restrictions on many large-scale fermentation procedures involving genetically engineered microbes. This means that steps applicable to an unmodified organism can usually be followed for genetically engineered varieties. In taking these actions, NIHRAC decided not to tamper with its definition of recombinant DNA, but rather to amend specific sections of the official guidelines for recombinant DNA research. It voted overwhelmingly to define deliberate release as "the planned introduction of recombinant DNA-containing microorganisms, plants, or animals into the environment."

At a meeting last autumn, the committee recommended exempting from review virtually all deliberate release experiments involving gene deletions within an organism. NIH director James Wyngaarden, who must approve such recommendations before they become effective, has delayed doing so pending completion of an environmental assessment. Nonetheless, NIHRAC voted in February to extend that same kind of exemption to experiments involving single base changes and gene rearrangements within a given species of microorganism, including the full range of bacteria, viruses, and fungi. The committee explicitly deferred extending this exemption to experiments with higher plants and animals.

Despite lopsided votes, the debate within NIHRAC over easing restrictions on such experiments has been particularly lively. Committee member Frances Sharples, an ecologist from Oak Ridge National Laboratory (Oak Ridge, TN), renewed her strong objections to defining deliberate release exemptions in terms of broad categories, which eventually are to be described in appendices to the NIH Recombinant DNA Guidelines. She calls it "questionable" to change the guidelines "without those appendices being in place."

Moreover, referring to a wide range of possible deliberate release experiments, Sharples said: "It really bothers me that the committee says it doesn't care that something harmful might be produced, even though a recombinant DNA process is involved." She urged the committee not to narrow its oversight any further.

Other committee members, however, urged moving forward, particularly for the category of vaccine testing where genetically engineered microorganisms are involved. Vaccine development "is being impeded," says ad hoc consultant to the RAC, Gerard McGarrity, a microbiologist from the Coriell Institute for Medical Research (Camden, NJ). Effective means for evaluating and approving such vaccines now are lacking, he added, and the situation is "approaching crisis dimensions." After considerable debate, the committee swept aside Sharples' objections and those of several representatives of public interest groups. In effect, it restricted the working definition of recombinant DNA, excluding from further NIHRAC review many kinds of deliberate release experiments involving microorganisms.

But the committee balked at the suggestion that it halt its review of applications for human gene therapy procedures. Although FDA may have formal responsibility for evaluating such research, NIH officials are determined to play a key role at least in the early phase of this emerging medical technology. NIHRAC, with its proven ability to serve as a public forum, is viewed as an appropriate place for airing some of the sensitive ethical and policy issues that gene therapy will raise. Plans for educating the public on such issues already are being included on the committee's agenda.

—JLF