An entirely different perspective on how the university is doing in managing the lab is held by antinuclear critics, whose views are shaped by their hopes for change in the UC role. The conversion project is a coalition made up of groups and individuals with differing—in some cases widely divergent—attitudes, but they have managed to agree on basic policy and tactics.

The three main components of the coalition are the War Resisters League/West, Berkeley Students for Peace, and the Ecumenical Peace Institute. The coalition represents elements which came together in the movement opposing U. S. involvement in Vietnam. Observers say the current coalition is more patient, less radical in its rhetoric, and at least in its outward manifestations, not sectarian politically.

Charles Schwartz, a Berkeley physics professor who has been a campus gadfly on political and social issues and is associated with the conversion project, says that while members of the coalition want to see the labs converted from military research they see it is "impractical to say stop it." Majority feeling is that the university can't unilaterally convert the labs. The coalition wants the university "to engage in efforts with others to control developments in the labs." Most see conversion as a long-term goal. Some, who adopt a strict moral position, insist that to accept the long-term goal is to legitimize weapons involvement.

The immediate aim of the coalition, however, is to generate discussion and debate involving people outside the university community as well as within. Members of the project see the acquittal of the six members of the group in the trespass trial as a sign of growing public awareness and concern about the nuclear arms issue.

Obstacles to Discussion

Conversion project leaders say the group is pleased with the progress made in prodding the university administration to address the problem and in learning more about the structure and programs of the labs. They argue that lack of public knowledge about the labs has been a major obstacle to a critical public discussion on the subject of nuclear weapons.

The plan is to keep the pressure on the university—a demonstration at Livermore is scheduled for late April—and to carry on with the effort to build a broad political base of opposition to nuclear arms.

The coalition members recognize the complexity of the problem, acknowledging that the Soviet Union also has a nuclear weapons program and that the problem of nuclear proliferation has attained serious dimensions. But they justify concentrating on the U.S. weapons labs on the grounds that the United States has been the innovator and consistently set the pace in the arms race, and that heading off new weapons development offers a hope of slowing the race which shows signs of getting out of control.

The fact that the weapons labs are of but not in the university is obviously bothering people in a way that it did not 10 years ago. Some observers say that the UC faculty are increasingly embarrassed by the university's tie to the weapons labs and would like to cut the silver cord. But the Gerberding report has come along with a suggestion that the university redefine its public service function by attempting to manage the labs in a more meaningful way. And surprisingly, the principal parties in the debate seem warily willing to give it a try.

—JOHN WALSH

New Review of Nuclear Waste Disposal Calls for Early Test in New Mexico

Searching around the country for a suitable place to bury the high-level wastes produced by commercial nuclear power, the government appears to have moved one step closer to deciding that the first repository will be placed in the state where the atomic age began, New Mexico.

After a 3-month study, a special task force reviewing waste management for the Department of Energy (DOE) has found that highest priority should be given to the capability to place spent reactor fuel in permanent geologic disposal. (In the past, the emphasis was on proper disposition of wastes from chemical reprocessing of fuel, which the Carter Administration has decided to delay indefinitely.) To start the demonstration, the task force recommended that 1000 reactor fuel assemblies representing about 500 tons of fuel be buried in a bedded salt formation in southeast New Mexico not far from Carlsbad. The fuel is to be deposited in a specially built mine designed to provide access to the Salado salt formation at a depth of 2100 feet. Construction of the mine has not yet begun, but the demonstration is due to start in 1985.

The task force report was quickly criticized by state officials, whose immediate concern was the degree of control they will have over future waste disposal plans. "This report makes passage of a bill to give states like New Mexico veto power over waste disposal projects more important than ever," said Senator Peter Domenici, one of the state's two Republican senators, only hours after the report was released. Just a few weeks ago the New Mexico congressional delegation was assured of such veto power by DOE Secretary James Schlesinger (*Science*, 10 March), but the latest department statement revived the feeling that DOE plans for the Carlsbad site were changing so precipitously that state control was becoming illusory.

The Carlsbad project, named the Waste Isolation Pilot Plant (WIPP), started as a plan for geologic disposal of low- and intermediate-level "military" wastes—debris generally contaminated with plutonium but not containing the hottest products of nuclear reactions. Next, it was suggested for disposal of high-level military wastes, first on an R & D basis and then on a fully licensed basis. Now it is being proposed for high-level civilian wastes, at least on a limited scale. The latest recommendations present "an entirely different picture than the one indicated by recent DOE policy," says Domenici. What remains true, however, is that the WIPP site in New Mexico is the only location where the federal government has elicited even tacit approval for permanent geologic disposal of wastes that are radioactive at any level. After being rebuffed by at least a half-dozen states over the past 2 years (*Science*, 23 September 1977), the government has rather limited options, particularly if it needs to move quickly.

The proposal for the Carlsbad site is

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that it be used not only for engineering verification of the interactions of spent fuel with salt, but also for disposal of 1000 fuel assemblies in an area covering up to 20 acres. Calling this proposed first effort a "modest demonstration," the DOE task force said the spacing of these assemblies should be "technically conservative" enough that the heat generation per acre would be considerably below what is expected for a full-scale operating repository. In case the demonstration failed, the fuel would be recoverable up to 15 or 20 years, says the DOE report. If no problems arose the disposal would be permanent. The WIPP spent fuel disposal demonstration should be submitted for licensing by the Nuclear Regulatory Commission, said John Deutch, DOE's energy research head, in presenting the task force report. "I am very confident WIPP will be licensed and confident it will be available by 1985," Deutch said.

Previously, 1985 was the target date set for operation of the first full-scale repository, but the task force concluded it could not be met. The Deutch task force selected 1988 as the earliest a national repository could begin operation with timely action in all parts of the approval process, and commented that delays of the sort expectable in licensing and site selection could slip the date to 1993. Facing the prospect of substantial delays DOE appears to have seized on WIPP as a way to make some progress by the 1985 target date.

Waste disposal will not be inexpensive, and the latest review offered one of the first comprehensive cost estimates. Up to $23 billion (in 1977 dollars) is expected to be the bill for disposing of civilian and military wastes until 2000.* More than half of the total, according to Roger LeGassie at DOE, is attributable to commercial wastes.

The Deutch task force has been given high marks for its openness in consulting with critics of the government's waste policy. Its report is of higher quality and shows less engineering arrogance than the last review of national waste policy (under the DOE's predecessor, the Energy Research and Development Administration), according to one of the leading critics, Terry Lash of the Natural Resources Defense Fund. The DOE task force called for extending federal responsibility over all wastes, including low-level ones such as those at Maxey Flats, Kentucky, recommended unequivocally that all long-term waste disposal facilities should be licensed, and affirmed the importance of the National Environmental Policy Act's processes for the waste management program. (Decommissioning of defunct reactors would remain the responsiblity of the utilities owning them.) The White House has set up an interagency committee to design a new waste policy based on the recommendations of the Deutch task force. "The process that has been started should be complimented," says Lash. "As the beginning of a new policy, it is very pleasing."

Nevertheless, Lash and others have criticized the task force for its finding that existing knowledge indicates that high-level wastes can be safely disposed of in geologic formations and for its recommendation to proceed to put wastes in the Salado formation at the WIPP site.

Satisfying the California Law

California has a law requiring that its energy commission hold up new nuclear plants until the commission determines that developed waste technology exists and has been demonstrated and approved. The California commission has visited DOE field offices and national laboratories and just completed a yearlong study of the waste program under Commissioner Emilio E. Varanini. Its basic conclusion is that the scientific feasibility of the geologic disposal concept has not yet been established. "Validation of the entire concept is what is critical," says Varanini, or otherwise the debate over the salt disposal concept will degenerate into an "engineering shootout." He singles out the sketchiness of knowledge about waste-rock interactions in the proposed salt formations. "Non-licensed experimental salt vaults would tell in about five years" if the gross features of the government concept were working, Simon says, but present calculations of the integrity of a loaded salt vault are based on laboratory and oil company data on formations different from those intended for use. The energy commission's position is that the present data cannot ensure that the wastes will remain locked up in the salt and that moving too quickly to engineer an uncertain concept could result in further delays and backtracking.

"The DOE view is that it is important to get some waste in the ground," says Gary Simon, staff scientist for the commission. "Our view is that you must make a scientific demonstration that the waste will stay where you put it in the ground." Since much of the urgency for a new waste program comes from the existence of the California law and the possibility that other states will adopt similar ones, the energy commission's view is significant. Asked if the new plan would satisfy the California law, Deutch said "In my view, it will meet those requirements."

Since drilling to test the Carlsbad site has barely begun, there are still questions about its suitability. Boring at the first selected site hit a pocket of brine and gas, so the location was moved 7 miles southwest to the present location. One bore hole has been made there and two more are scheduled later this year. There is minable potash above the Salado formation and possibly oil and gas below it. Questions arise about whether extraction of these resources would be allowed, and whether it might lead to an inadvertent breach of the sealed repository some millenia hence. Salt formations were selected because their continued presence indicates a minimal interaction with groundwater, which would dissolve the salt, but dissolution nonetheless occurs and questions have been raised about whether the maximum future rates of dissolution can be adequately predicted from the present geotechnical information base. "I don't think it is wise to designate WIPP" for an early experiment with high-level commercial waste, says Lash, who thinks 1000 assemblies "would seem excessive." The proposal for WIPP must pass the full sequence of environmental impact and licensing procedures, so these questions will get a thorough airing.

In spite of its designation as a pilot plant, WIPP is going to be a large project (covering 3 square miles on each of two levels), of which the proposed commercial waste demonstration will take up only a small part. Other large repositories could possibly be located nearby. The Salado formation extends at least tens and probably hundreds of miles in three directions. Although the Department of Energy says that it will not choose a site for the first national repository before late 1979, it could be very hard for the beleaguered agency to overlook the advantages of a location where it could practically duplicate the environmental and licensing procedures of its "modest demonstration" at WIPP.

Citizen opposition to waste disposal was minimal a year ago but is now organized and building. What the residents and officials of New Mexico are no doubt afraid of is that if they allow a few hundred tons of fuel in the door, several hundred thousand more will follow.

—WILLIAM D. METZ

*Assuming the total number of reactors in 2000 will be the number for which licenses have already been granted or requested, namely 138, the total cost estimate (in 1977 dollars) is $13 billion. If reactors are as plentiful as the official administration estimate (380 in 2000), the total cost will be $23 billion.