

Plutonium: A valuable commodity or just waste?

LANL scientist: Leftover plutonium will be worth something someday

By KEITH EASTHOUSE
The New Mexican

1/4/94
As the United States dismantles thousands of nuclear warheads, the country's stockpile of plutonium is growing — and so is the problem of what to do with a material that can remain radioactive for 240,000 years.

Some have argued that it should be mixed into glass and buried, perhaps under the sea. Others say it should be destroyed — either by rocketing it into space or by blowing it up underneath the Nevada desert.

Sivasankara Pillay, a scientist at Los Alamos National Laboratory, said in a recent interview that the deadly radioactive metal has too much value as a potential energy source to throw away.

"It would be most criminal to

destroy this resource," said Pillay, who manages the waste minimization program for the lab's Nuclear Materials Technology Division.

Pillay's argument that plutonium should be used and not disposed of drew strong criticism from a member of a Santa Fe-based watchdog organization.

"Plutonium is not a substance of commercial value. It is a most troubling and expensive waste product," said Greg Mello of the Los Alamos Study Group.

Pillay's views on what should be done with the country's plutonium stockpiles are contained in a paper, "Disposition Scenarios and Safeguardability of Fissile Materials under START Treaties," that he presented at a meeting in San Francisco last month of the American Nuclear Society.



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Los Alamos Study Group

economic value. Pillay estimated that the amount of plutonium from U.S. and former Soviet weapons scheduled for retirement under the two Strategic Arms Reduction Treaties could be worth more than \$1 trillion if exploited as an energy resource.

"Before we throw it down a hole or shoot it to the moon, we need to be well aware of the peaceful uses (of plutonium)," Pillay said.

The contention that plutonium has tremendous economic value was disputed by Arjun Makhijani, a prominent Energy Department critic with the Institute for Energy and Environmental Research in Takoma Park, Md.

Makhijani said that the cost of converting plutonium into a form where it could be used for energy generation is prohibitive, particularly when uranium

force to consider how much plutonium the nation needs in the post-Soviet era and how to dispose of what is surplus.

These are among Pillay's major points:

■ Plutonium has tremendous

The issue of what to do as plutonium from dismantled warheads accumulates has become one of the thorniest problems facing the country. In September, President Clinton announced the formation of an interagency task

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PLUTONIUM

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prices are so low.

"The costs of conversion are so large that uranium prices would have to increase many-fold before plutonium could be competitive as an energy source," Makhijani said.

"Plutonium is only theoretically an energy source. It is not practically an energy source," Makhijani said.

He said plutonium has other costs associated with it, including preventing it from contaminating the environment and implementing security measures to ensure it won't fall into the wrong hands.

"Plutonium should be declared a waste. It's an economic and environmental liability," Makhijani said.

"The hazards of plutonium have been exaggerated.

Pillay said plutonium suffers from an unjustified image problem.

"The reason for the problem is the public misperception that plutonium is the most dangerous substance on earth," Pillay said. "It's become kind of a religious belief. There's no science behind it."

Pillay said that an equivalent amount of cyanide is more harmful.

Mello said that microscopic

amounts of plutonium can cause cancer if inhaled. He also said that the major pollution problem posed by plutonium is its longevity in the environment.

Pillay said that if plutonium is mishandled it can seriously contaminate the environment and pose a health hazard. He called the DOE's Hanford reservation in Washington state, which is plagued by radioactive pollution from past operations, "probably the most contaminated place on earth."

But he argued that such contamination has occurred not because plutonium is inherently unmanageable but because the emphasis in the past has been on developing nuclear bombs, not on protecting the environment.

"Plutonium hasn't been the problem. It's the idiots who were handling it," Pillay said.

Pillay said the likelihood that massive contamination would result from plutonium use is much less now because the emphasis at Los Alamos and other DOE facilities has shifted to environmental protection.

"The DOE has turned around 180 degrees," Pillay said. "It's been almost a religious conversion. Compliance (with environmental laws) is now the order of the day."

Other countries will use plutonium for energy even if the United States doesn't.

Pillay said several nations, including the former Soviet republics, have developed technologies for using plutonium in light water reactors or fast breeder reactors to produce energy.

"These technologies were (first) developed in the United States. Then others borrowed and became masters of these technologies," Pillay said. "If we need these to meet our future energy needs, we could begin exploiting them today."

Pillay said plutonium could be used for large-scale power generation if the United States were to ease restrictions on using it for such purposes.

"The United States should hold onto the plutonium it has until society can figure out the best uses for it.

Pillay said that in the current climate of anti-nuclear sentiment, using plutonium as an energy source is not likely to happen. He said that "if the present generation cannot find a use for these materials, it may be prudent to save them for a future generation."

He said that plutonium has been stored safely for the past 50 years, and there's no reason to think it cannot be stored safely in the future.

Pillay said that by saving, rather than destroying, plutonium, the current generation could be leaving the future gen-

eration a down payment on the national debt because of plutonium's value.

"The United States should consider lending, leasing or selling surplus plutonium from retired weapons to friendly countries under full international safeguards.

Pillay also said that properly safeguarded plutonium could someday be one of the most valuable commodities traded on world markets.

Makhijani said the costs and risks of such transactions — including the chance that plutonium could fall into the hands of terrorists — would greatly outweigh whatever benefits they would bring.

He said that rather than advocating the trading of plutonium on world markets, Pillay should be worrying about what might happen to the huge amounts of plutonium from retired weapons accumulating in Russia.

"It would be irresponsible to not worry about a potential black market in radiation weapons in Russia," Makhijani said.

Mello said that creating a "plutonium economy" would threaten civil liberties because it would require giving the state highly intrusive powers of search, interrogation and wiretapping because of the danger of theft posed by terrorist groups.

EIS

(from Page 1) documentation regardless," Siebach said.

sary, there was disagreement about stopping LANL waste-generating activities.

Riseley said in a telephone interview today that LANL should halt temporarily the work toward a Mixed Waste Disposal Facility and the expansion of Area G at Technical Area 54. Both are planned radioactive waste disposal facilities. "Those plans should be put on hold while they do an EIS," she said.

She said that the areas should be considered in a sitewide EIS. An EIS must examine a no-action alternative, and Riseley said if the lab builds the disposal facilities, it's too late for the no-action alternative to have effect.

"There is great danger in building these very large dumps," Riseley said. "They have much greater capacity to handle generated wastes. It sets the lab up for being a nuclear weapons project in miniature."

But Siebach said that LANL operations wouldn't be stopped during an EIS.

He said the activists essentially called for LANL to "shut down all research and development, production, and waste management operations until the EIS is complete." But interim operations will continue, he said.

However, he said, "If there are interim actions that have a significant impact on the quality of the human environment, we will do interim NEPA documentation on those activities."

He cited as an example the remediation of Area G "TRU pads," places where transuranic waste destined for the Waste Isolation Pilot Plant is stacked out of compliance with current state regulations.

DOE's waste management program "will be doing a some sort of sitewide waste management NEPA

LANL, DOE agree lab needs new impact statement

By STEPHEN H. SHANKLAND
Monitor Staff Writer

At a recent meeting with several activists, Los Alamos National Laboratory and Department of Energy officials agreed that LANL needs a sitewide environmental impact statement (EIS).

Many activist groups, including Concerned Citizens for Nuclear Safety and the Los Alamos Study Group, have been asking for a sitewide EIS for several years.

The sitewide EIS is required by DOE regulations. LANL has one, but it dates from 1979. Documents such as environmental impact statements and environmental assessments are required for certain facilities by the National Environmental Policy Act (NEPA).

"The time is ripe to do this," said Diana Webb of the DOE's Los Alamos Area Office. "There is unanimous consent that the 1979 EIS needs to be redone."

Webb said the move to conduct a sitewide EIS "how came from public interest in the process."

Webb said Bruce Twining, head of DOE's Albuquerque Field Office, sent a memo to DOE headquarters several months ago suggesting planning for a sitewide EIS for LANL.

But Webb and Peic Siebach, a DOE headquarters official who also attended the meeting, said there is a

long way to go before an EIS actually is begun.

Siebach and Webb said a funding source within DOE must be found. Although neither could say exactly how much a sitewide EIS would cost, Webb said it would be in the neighborhood of \$10 million. Siebach said the most recent sitewide EIS for Lawrence Livermore National Laboratory, completed in 1992, cost \$15 million.

An EIS probably will take at least three years to complete, Webb said. And Siebach said that the work probably wouldn't begin until January 1996.

A sitewide EIS also requires "buy-in" from other assistant secretaries at DOE, Siebach said. Webb said that although people from these other programs probably agree that an EIS is necessary, the official procedures will take some time.

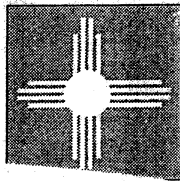
Jerry Bellows, manager of DOE-Los Alamos, agreed at the meeting to formulate a strategy for funding and organizing the EIS, Siebach said.

Harry Otway, who attended the Friday meeting, said LANL supports the sitewide EIS.

Mary Riseley, an activist with the Santa Fe-based Los Alamos Study Group, said that although those at the meeting agreed an EIS was necessary

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THE NEW MEXICAN

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SECTION B

LANL cuts size of proposed waste area

By KEITH EASTHOUSE
The New Mexican

Los Alamos National Laboratory has proposed reducing the size of a controversial expansion of its nuclear waste disposal area from 70 acres to approximately 28 acres, laboratory officials said Wednesday.

Tony Drypolcher, leader of the lab's Waste Management Group, said the lab recently proposed scaling back the expansion of Area G to the Department of Energy, which will make the final decision.

Diana Webb of DOE's Los Alamos Area Office said the smaller expansion and the original plan are both under re-

view by the agency. Pete Siebach of the DOE's waste operations division in Washington said the review would be completed by the end of the summer.

The plan to expand Area G, which borders San Ildefonso Pueblo land, is deemed necessary by the lab because the facility — opened in the 1950s — is running out of room.

Solid, low-level nuclear waste — some of it mixed with asbestos and PCBs — is buried in pits at Area G. Additionally, plutonium-contaminated waste bound for the Waste Isolation Pilot Plant, the underground nuclear waste repository

near Carlsbad, is stored at Area G. So is mixed waste, which contains both radioactive and chemical substances.

The expansion has raised the ire of the American Indian leaders, in part because any expansion would result in the excavation of centuries-old Indian ruins.

Indian leaders could not be reached for comment about the lab's proposal for a smaller expansion.

Drypolcher and John Krueger, facilities manager for Area G, said the smaller expansion would require that six to eight archaeological sites be exca-

vated — "substantially less" than the number of Indian sites that would have been impacted by the larger expansion, Drypolcher said.

Mary Riseley of the Los Alamos Study Group, a citizens watchdog organization, said that no expansion should be undertaken until a full-scale review of the environmental and health impacts of laboratory operations is completed.

Lab and DOE officials recently committed to undertaking such a review, which would involve the preparation of a huge document called a sitewide environmental impact statement.

DOE to complete review of plan by summer

The smaller expansion is in line with the recommendations of an internal laboratory group called Our Common Ground, which argued for a smaller expansion in a 1993 report.

Our Common Ground said the lifetime of the existing disposal area at Area G — estimated in 1991 to be as little as two years — could be increased to eight years or more through waste minimization techniques.

Krueger and Drypolcher said such techniques already have caused a reduction in the volume of waste coming into Area G.

Nonetheless, Krueger said the facility could fill up by the end of 1997, or sooner if larger-than-expected amounts of waste are generated.

LANL on list as waste disposal site

Staff and wire report

Los Alamos National Laboratory is on the list of sites the Energy Department said are under consideration for a future disposal site for the department's low-level radioactive and hazardous waste.

However, Paul Aamodt, deputy group leader for Los Alamos' environmental restoration office, said Friday that the DOE's Nevada Test Site was the prime contender for such a facility.

"I would give this very little

I don't think we're a prime contender at all.

PAUL AAMODT

Los Alamos' environmental restoration office

credibility," Aamodt said in a telephone interview from his El Rancho home. "I don't think we're a prime contender at all." He said that a planned disposal

site at the lab for so-called "mixed waste"—waste contaminated with both radioactive and chemical substances—is being designed to take only waste gen-

erated at the lab. It is not intended as a disposal site for waste shipped to Los Alamos from elsewhere, Aamodt said.

"We've never looked at that as but a lab facility," Aamodt said.

Low-level radioactive waste is currently located at the laboratory's Area G site, Aamodt said. The laboratory wants to expand the disposal area, but has run into opposition from San Ildefonso Pueblo, which has land bordering the waste dump.

As for non-radioactive chemi-

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cal waste — called hazardous waste — Aamodt said that the lab typically ships it off-site for treatment, such as incineration.

The DOE has examined all 49 sites that make low-level mixed waste — containing both radioactive and hazardous materials — and dropped 23 from the disposal site search, said department spokesman Brad Bugger.

In the first round of the study, a department committee asked three questions about each potential burial site:

■ Is it 61 meters from an active fault?

■ Is it outside a 100-year flood plain?

■ Is a 100-meter buffer zone available around the disposal site?

The answers to those three questions narrowed the list to 26 sites, including Los Alamos and Sandia National Laboratories in Albuquerque.

Next, the department will confer with the National Governors' Association, which is representing state governments in determining how to choose one or more low-level waste graveyards

POSSIBLE SITES	
The following Energy Department sites are still under consideration for a future disposal site for the department's low-level radioactive and hazardous waste:	Site A, Plot M, Palos Forest Preserve
California	Paducah Gaseous Diffusion Plant
Energy Technology Engineering Center	Missouri
General Atomics	Weldon Spring Site Remedial Action Project
General Electric Vallecitos	Nevada
Lawrence Livermore National Laboratory	Nevada Test Site
Colorado	New Mexico
Rocky Flats Plant	Los Alamos National Laboratory
Florida	Sandia National Laboratory
Pinellas Plant	New York
Idaho	Brookhaven National Laboratory
Idaho National Engineering Laboratory	Knolls Atomic Power Laboratory, Kesseiring
Illinois	Knolls Atomic Power Laboratory, Niskyuna
Argonne National Laboratory-East	West Valley Demonstration Project
	Ohio
	Fernald Environmental Management Project
	Mound Plant
	Portsmouth Gaseous Diffusion Plant
	Pennsylvania
	Bettis Atomic Power Laboratory
	South Carolina
	Savannah River Site
	Tennessee
	Oak Ridge Reservation
	Texas
	Pantex Plant
	Washington
	Hanford Site
	The Associated Press

for the nation.

"We are doing this in cooperation with the states," Bugger said. "This isn't just a DOE attempt to find a disposal site."

The governors' group and the federal government have not yet

determined how many sites will be needed to dispose permanently of more than 2 million pounds of low-level mixed waste generated each year by the Energy Department.

However, Bugger said the gov-

ernors and the department are working toward a December 1995 goal for proposing "a final disposal strategy."

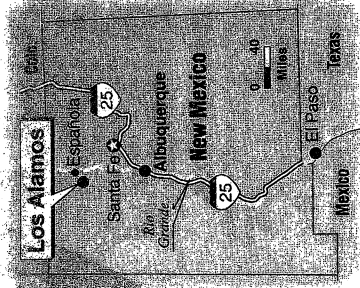
"It could be a regional approach, it could be several sites, it could be just one," he said.

ATOMIC LEGACY CULTURE

The nuclear age, born 50 years ago, produced its own culture of genius and madness. At Los Alamos, where The Bomb was born, a new generation of invaders settled into an uneasy truce with impoverished Hispanics in the valley below.

WORLDS APART

By Jim Carrier ♦ Denver Post Staff Writer
LOS ALAMOS, N.M. — On the high, dun bluff called *Barro Colorado*, a network of atomized the tint of blood, above villages adorned with red ristras and black clay pots, the birthplace of the atom bomb is curiously colorful.



Cloistered, conservative, not even marked by a monument. But beneath the war-weary, retreated exterior of the most infamous village in the world is a most bizarre collection of artifacts from the nuclear age. And a conflict as old as mankind. Here, one finds bomb parts, bomb designs, films of bombs blowing up; uranium, beryllium, an apricot tree with plutonium in the fruit, cash machines called "A(0)M," 1,700 sites with hazardous waste, cancer cases, beagle bodies and the life work and ghosts of the brilliant and petty who passed through the Los Alamos National Laboratory.

"If atomic bombs are to be added as new weapons to

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In January 1950, three months after the Soviet Union exploded a copy-cat bomb and four days after Klaus Fuchs admitted he'd stolen the plans from Los Alamos, President Harry Truman ordered work on the "Super," or hydrogen, bomb.

The first one, 1,000 times more destructive than the Hiroshima bomb, exploded in 1952 in the Pacific.

As the arms race heated up, military adviser John Van Neumann sat in the living room of Carson Mark, head of the lab's theoretical division. "He asked me, right in this room, did we think we could make a megaton that didn't weigh more than a ton? I assured him we could."

The result was the first nuclear missile capable of reaching central Russia, big enough to destroy anything within one-half mile, the navigational error at the time.

"The military guys would come and say, 'We would like a new bomb to go with our new bomber,'" said Mark. Similarly, "if we thought we could do something really novel, we let them know."

The billions of dollars spent on bombs also produced world-class science: super-fast computers and cancer, super-cold refrigeration. "They always had the best stuff there," said John Cary, a plasma physicist at the University of Colorado who spent two years on the Hill. "They wanted to model how weapons exploded, so they'd have four Cray supercomputers at a time when Boulder's National Center for Atmospheric Research would have one."

Life on the Hill was "utopian — a paternalistic company town," wrote Chambers. The Atomic Energy Commission was godfather, and citizen boards oversaw schools, the pool and the ski hill.

Women from pueblos in the valley cleaned houses and did laundry. Hispanic women were secretaries, and Hispanic men began working as guards and technicians, jobs they still dominate.

Growing up in this atmosphere was strange and exhilarating. Scientists kids got the best education in New Mexico, thanks to federal subsidies. At a reunion of the Class of '74 last summer, many grads confessed they'd moved back to raise their children in a town they remembered as safe.

"We were protected," said Nancy Strain, daughter of a bomb maker. "I was 22 years old before I pushed a lawnmower. My dad said it wasn't safe. Five years ago, I learned what he did."

"The lab opened up another world," said Evelyn Vigil, a granddaughter of valley Hispanics who used to graze sheep on the plateau. She and her two siblings, who lived in

months at a time. If you think it was easy, it wasn't. We called Los Alamos the Heavenly City of Free Love Above the Clouds. There was wife-swapping and high divorce rates."

Los Alamos later had the highest birth rate in New Mexico, requiring nine elementary schools.

But the unspoken nature of the lab's work, juxtaposed against an idyllic lifestyle, tore some kids up in the turbulent Vietnam period. Bob Moore dropped out of school, but when his father transferred from bombs to solar energy cells, "it was like flipping a switch. He went from being the biggest ass . . . to the best friend I ever had."

Tim Ashby lost friends to suicide, drugs and alcohol, paths he ventured on himself.

"Los Alamos was this perfect backdrop for self-destruction. There was something wrong with what the town was doing. Trying better ways to kill people. The whole deal, rich and white in the middle of poor minority, played into it."

Villagers also lived uneasily with radiation and with frequent explosions that echoed from canyons around them.

Chambers' physicist husband William sometimes called from the lab at 6 p.m. to say he'd be home late. "I have to take a shower," he told her. He had been irradiated.

No rules, no limits

Not until the 1980s did anyone in the state realize that the lab was also producing nuclear waste. Environmental assessments, new to defense installations, revealed 1,100 radioactive dumps on the plateau. Deep pits held plutonium, the carcasses of beagles and other test animals and contaminated lab equipment.

"It seemed the whole culture was built around an unlimited budget, and people acted that way," said Don Dusenberger of nearby Chimayo, a lab environmental assessor until last year. "When they had a radioactive building, they just bulldozed it."

Pueblo dwellers and Santa Fe activists suddenly discovered 20 years of unclassified monitoring that material-of-factly described radiation leaving the lab in the air and water. Tiny amounts of plutonium were in the Rio Grande.

The lab's seeming double standard — a regard for the safety of its workers but not its neighbors — was evident in two cases: rumors of a brain cancer cluster in western neighborhoods of Los Alamos and the secret release of radioactivity in Bayo Canyon. Rumors of the cancer cluster,

Los Alamos, went on to college while cousins in the valley did not.

"Once you're in it, it's a matter of competition," said Vigil, now the publisher of the daily newspaper, the Los Alamos Monitor.

The village was gated and guarded until 1957. "It was almost like going into a foreign country," said Emilio Romero, a former state historian. "My father would say, 'Don't ask too many questions.'"

New Mexico didn't question the lab's role. The memory of a state National Guard unit slaughtered in Batavia in 1942 remained fresh. There was also the fat federal bucket, pouring dollars into counties that had been among the poorest in the nation.

At the time the lab opened, the Hispanic household income of \$452 per year was the lowest in the nation, infant mortality was 126 per 1,000 (three times the national average) and 80 percent of deaths were listed as "cause unknown." One researcher described people as "clinging tenuously to a precarious way of life."

With more than 10,000 employees, Los Alamos became the state's biggest payroll, creating 35 percent of all economic activity in the upper Rio Grande Valley. Hispanic family income quadrupled.

On the Hill, the typical scientist's wife "learned from the very beginning she was an appendage, an afterthought," said the tart-tongued Chambers in a tour of the village.

"Starting with the Bikini tests (in 1946) until 1958, the men were in the Pacific for six

LOS ALAMOS from Page 1A
the arsenal of a warring world," Robert Oppenheimer predicted on his last day as director in 1945, "then the time will come when mankind will curse the names of Los Alamos and Hiroshima."

After five decades of terrifying the entire world, Los Alamos is damned at home, too.

Its star was gizmos overshadow more medicine men, the have-it-all lab looks down on have-not towns and the nation's best computers predict destruction while families near-by pick chiles.

Today, the lab is floundering, in search of a worldwide mission and a backyard truce in the cultural clash it perpetuated.

This is a place filled with minds that can solve any problem, except the oldest one — how to get along with your neighbor.

The high ground

Robert Oppenheimer wasn't the first to admire the view, or hide secrets on the Hill.

The Anasazi found defense on the long, stony fingers 1,000 feet above the Rio Grande. The pueblo dwellers gathered herds for cures.

The Spanish, who came for gold, stole it fair and square from Indians for a yoke of oxen, 36 ewes, one ram and \$20.

A private boys school bought it "to undo the work of women, mothers and schoolteachers. To make men." So the atomic bomb lab that arrived in 1943 was only the latest invader.

"Angles could overcome climatic changes that pushed Indians and Spanish off," wrote historian Marjorie Bell Chambers. "The federal subsidy made it a permanent community." But after its first bombs were dropped and Japan surrendered in 1945, Los Alamos nearly fell apart. The famous men left and "most remaining scientists lacked the spark of genius," according to an official history.

"The only thing that kept (the lab) going was fear of Russians," said Chambers, author of "Technically Sweet Los Alamos," a history of the town's transition that borrowed for its title Oppenheimer's description of the bomb's physicists.

Denver Post
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ees women or minorities.
But of 6,500 lab employees, only 120 are Indians. Of 30 top managers, one is Hispanic, one is a woman and one is black.

The Hispanic story is "very, very mixed," conceded Sigfried Hecker, the lab director, who last year eliminated an advisory Hispanic Council and other special-interest groups. "We weren't pulling together."

For every case of discrimination, he said, one can find a "heart-warming story" of Hispanics youths going to college with lab support, a satisfied worker able to keep a traditional northern New Mexico lifestyle.

"Look at other parts of northern New Mexico without this stability. You find people struggling to survive and trouble keeping their land. The younger people are leaving," said Saegal.

Today, Los Alamos is reeling not only from the discontent of neighbors but the harsh realities of the post-Cold War era. The budget this year slipped to below \$1 billion for the first time in years. Employment in "core weapons" has declined to 900, half of what it was in 1987. No one has designed a nuclear bomb since 1989.

The lab's own "happiness survey" found a majority of employees don't like management, and a Colorado psychiatrist was recently hired to

do.

Los Alamos' own ambiguity toward what it created on the Parjito 53 years ago was seen in January, when children proposed to place a peace memorial near the new Los Alamos library on the 50th anniversary of Hiroshima. Children from 50 states and 53 countries competed to design a statue.

When the idea came before the county, Councilor Jim Greenwood worried aloud that the statue would become a rallying point to indict the town for its role in creating nuclear weapons.

"I am not worried about the kids out there, but I am worried about some of our adult friends — the so-called peace activists." He also worried about what it would say: This could be anywhere from a simple statement of peace to anti-war, anti-nuke, to anti-Los Alamos.

The statue was turned down. The children left the room crying.

"I am very, very frustrated, because they can't seem to get past the past," said David Rosoff, a 14-year-old from Albuquerque who helped collect 41,000 signatures from children and nearly \$20,000 in donations. "They need to focus on the future."

Stanley Crawford, a garlic farmer from Dixon.

Taken aback by the animosity, the regents created an oversight committee that held hearings in Santa Fe. Breaking a long silence, a number of Hispanics claimed mistreatment ranging from discrimination to harassment.

Rose Gonzales Nielsen, a technician at the plutonium facility TA55, filed suit claiming she has been fondled repeatedly.

"I was pouring a plutonium solution when a guy came up behind, pinched me (to the glove box), fondled my breast and kissed my neck," Nielsen became a member of a group of women called the Dirty Dozen who said they'd been fondled.

Their case was investigated and changes were made, according to Frances Menlove, the personnel chief.

Because they make up more than half of the technicians who work with radioactive materials, Hispanics also say they get a disproportionate share of radiation.

Of the 2,128 "staff" positions requiring advanced degrees, 138 are Hispanics, 23 short of national affirmative-action standards, said Menlove, the personnel director. Last year, the lab reached the milestone of having more than half of its employ-

ment to make 75,000 warheads was not made here."

Today, he says, 100 would be enough.

"We weren't working against the Russians. We were working against a problem, some technical thing," said Joseph Ladush, a 20-year veteran.

"Scientists love a puzzle, a challenge, something someone said no one can do. . . . We need a mission."

Today, Los Alamos scientists stand at a bridge that leads to opening records, working for industry, cleaning up the mess they left and coming to terms with neighbors and their past. Recent revelations about the lab's role in human experiments 40 years ago have been painful.

"We can't survive if people think we're a suspicious, dark eminence on the hill," said Gary Sanders, an astrophysicist who led a search for experimentation records.

So the lab still struggles with Oppenheimer's prediction. As long as nuclear weapons exist, Los Alamos will, too, and all that's right and wrong with the Atomic Age will remain here.

"The lab concentrates America's violence," claims Greg Mello, a Santa Fe pacifist.

Maybe Los Alamos and its neigh-

ists, and vice versa."

These perceptions are institutionalized by job and geography, said Usher, an Hispanic writer who quit the lab last summer. "There is a clear geographic split between classes that accentuates a real class division and pay-scale division."

"Remarkably little" of the lab's income leaves the Hill to the counties below, according to Bill Weida, a Colorado College economist. He calculated in 1992 that average family income in Los Alamos was \$90,000, compared to \$34,000 in adjacent Rio Arriba County.

The average wage of a Los Alamos resident at the lab was \$43,000, nearly twice that of a valley resident working on the Hill.

In a telling tableau of the cultural clash, a group from the valley, including three pueblo governors, traveled to Los Angeles in 1992 to speak to regents of the University of California, the contractor that runs the lab for the government.

The regents gave the group a few minutes to speak. Not enough for "heads of state," chided one of them.

"I pointed out that this has been a 50-year presence, so we had 15 seconds per year to finally speak," said

help employees deal with layoffs and fears that the lab might close. For beneath the usual portrayal of Los Alamos as a monolith are hundreds of scientists as different as the elements in the periodic chart. There are Sierra Club members, black-diamond skier, computer geeks and one geologist-ecologist who wants Los Alamos to teach creationism.

Sidewalks roll up at dark in a village that has gone from European democratic to technocrat Republican.

"I know a lot of nuclear (bomb) designers who wouldn't allow a gun in their house," said Jas Mercer-Smith, a design group leader.

"There are people who would never work in weapons, philosophically," said Carl Witenke, who runs advanced computers. "When I went in, I stood at the bridge and said, 'I'm about to embark on what could be the worst thing to happen to the world. I worked on these weapons knowing full well that as long as we remained No. 1, we would never have to use them.'"

If Los Alamos scientists were guilty of anything, it was single-minded devotion to a technical task that left them out of touch.

Carson Mark, for example, who oversaw the design of hundreds of nuclear weapons, says simply: "The de-

which made the news in 1989, had circulated in the lab as early as 1983.

Unknown to the public, the medical staff asked for permission to mount a modest investigation. The request was turned down.

A state study later ruled the cluster couldn't be proved, but it did find excessive numbers of thyroid tumors in Los Alamos County. Two members of Chambers' family lost half their thyroids.

In Bayo Canyon, from 1944 to 1962, scientists blew up radioactive lanthanum 244 times. When winds were blowing toward the lab, the tests were postponed. But not when they blew toward the San Ildefonso Pueblo, 8 miles away.

"There is no indication of any warnings to or consultation with local communities," according to a draft report of the President's Committee on Human Radiation Experiments. "The first efforts to inform the Pueblo Indians about the RaLa may not have occurred until 1994."

The committee estimates that the radiation created a 1-in-7 chance for a single, fatal cancer in the pueblo.

"All the canyons flow down to us. All the winds blow down," said Gilbert Sanchez, the pueblo leader, on a tour of a mesa that juts into lab land. "San Ildefonso gets impacted by everything they do at Los Alamos."

On one side is Area G, a dump where radioactive materials are stored underground and in temporary plastic tents. The lab wants to expand it.

On the other side is the lab's linear accelerator, the single greatest emitter of radiation, radionuclides with half-lives ranging from 71 seconds to 9.5 hours.

"If the wind is in the right direction and people are in here, they could breathe them," said Sanchez.

Realistically, the lab argues, the chances for just one additional cancer from the radiation is 1-in-47 million. It also claims risks to water from the dumped radiation are exaggerated. Trifluoromethane has been found in one well near the pueblo.

Clash of cultures

But of all the Western atomic installations, Los Alamos has had the least success in creating citizen advisory boards, perhaps because of racism and classism that shadow relations.

"The stereotypes go both ways," said Jim Sagai, a college teacher who lives in the valley and teaches on the Hill. "The valley looking up sees dil-



Paper: Santa Fe New Mexican, The (NM)

Title: LANL won't build waste facilities

Date: August 9, 1996

Canceled projects will save almost \$600 million over the next several years, according to lab estimates.

The cancellation of plans to build several major waste disposal and treatment facilities at Los Alamos National Laboratory will save almost \$600 million over the next several years, according to laboratory estimates.

The canceled projects include a \$140 million plant to treat radioactive liquid, an \$80 million dump for radioactive and chemical waste and a \$70 million facility to analyze the contents of waste drums bound for the Waste Isolation Pilot Plant near Carlsbad.

The decision to not build the facilities is primarily a result of financial necessity.

As the Republican-controlled Congress has shifted money to nuclear weapons work over the past two years, the lab's waste management budget has fallen 34 percent from \$94 million to \$62 million.

Lab officials say the impact of the shrinking waste management budget has been compensated for by recent technological improvements in waste analysis and treatment.

These improvements have made it possible to manage the lab's sizable stores of radioactive and chemical wastes more cheaply and quickly than had been thought possible a few years ago.

The most striking example is the plutonium-contaminated waste stored at the lab's Area G that is supposed to end up at WIPP.

Originally, the lab estimated it would take 37 years to analyze this waste, which is expected to fill about 42,500 drums. Such analysis is a necessary first step before the waste can be shipped to WIPP.

Stan Kosiewicz, a waste management official, said Thursday the lab now believes the job can be completed in fewer than nine years. The expected savings in operating expenses is \$270 million, he added.

"Some huge changes have been happening" that has made new approaches to waste management possible, Kosiewicz said.

The lab was going to build the \$70 million Transuranic Waste Characterization Facility to handle the WIPP waste. Now, according to Kosiewicz, the lab is planning to use "mobile systems" that will perform the same tasks that would have been done at the facility.

Such jobs include determining how much plutonium is in the drums, installing vents to expel hydrogen and reduce the fire hazard within the drums, and using mobile "glove boxes" so workers can open up the drums and peer inside.

The lab has adopted cheaper approaches in other areas of waste management work:

Shipping waste to disposal and treatment sites run by the private sector and located out of state instead of building such facilities at the lab.

Upgrading the lab's 33-year-old liquid radioactive waste treatment plant rather than building a new facility.

The switch to a less expensive, more streamlined approach to waste management was praised by a frequent critic of the lab.

"It's a good thing," said Greg Mello of the **Los Alamos Study Group**, a Santa Fe watchdog organization. "It shows how much of the environment and how much money can be saved when the lab is forced to do so."

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Author: KEITH EASTHOUSE

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DOE Plans To Bury, Burn Excess Plutonium

Ian Hoffman Journal Staff Writer

The U.S. Department of Energy announced Monday it will dispose of an estimated 55 tons of unneeded weapons plutonium by encasing some in glass for burial but turning most into nuclear reactor fuel.

"Whether we burn it or put it in glass, the outcome is the same: For the first time in history we're destroying and not creating plutonium," Energy Secretary Hazel O'Leary said Monday in a news conference from Washington, D.C.

Splitting the disposal of excess plutonium between burying it and burning it to produce energy will cost about \$2.3 billion, O'Leary said.

The disposal plan, which aims to make surplus weapons plutonium virtually unusable for weapons, goes into motion in 2003. The DOE has plenty of questions to answer before then.

It still must choose the three to five reactors necessary for burning plutonium-based fuel. And it must decide whether to bury canisters of glass-encased plutonium at Yucca Mountain in Nevada or elsewhere. For now, the DOE expects to store the canisters where they're filled, at its Savannah River Site, near Aiken, S.C.

In a separate part of the decision, Los Alamos National Laboratory was chosen to store another class of plutonium known as strategic reserve, which quickly can be made into pits or the cores of thermonuclear weapons in the event of war.

The vast majority of strategic reserve plutonium, however, will be stored at the DOE's Pantex plant in Amarillo, where weapons no longer needed in the stockpile are taken apart, department officials said.

The DOE revealed in 1994 that Los Alamos stored nearly 3 tons of weapons-grade plutonium at that time. A little more than half is part of 55 tons nationwide that is not expected to be needed for nuclear weapons.

To store such plutonium and other weapons materials, Los Alamos is preparing to fix a never-used nuclear-materials storage facility at a cost of \$45 million. Fatal design flaws prevented the building from opening. Engineers and architects are to begin on a new design in 1998, and the building is supposed to be finished in 2001.

Nuclear activists worried Monday that the announcement of LANL as a strategic reserve storage site might drive an expansion of the storage building.

"We went through the entire Cold War without needing it. Why do we need it now?" asked Greg Mello, head of the Santa Fe-based Los Alamos Study Group.

Likewise, the decision to burn surplus weapons plutonium in civilian reactors drew fire from activists. They contend other nations will view the move as dissolving the historical separation between the U.S.

weapons complex and the U.S. nuclear power industry.

U.S. arms-control experts are split on the issue. A month ago, John Holum, director of the U.S. Arms Control and Disarmament Agency, denounced the use of plutonium in civilian reactors. But he endorsed the idea Monday.

"This is real disarmament," Holum said. "My view is it's entirely responsible and proper to pursue both of these options and avoid putting all our effort into one."

The nuclear-power industry favors the move for two reasons. The decision endorses the use of plutonium in civilian reactors, a policy the industry has long sought. As part of the plan, the DOE would pay at least \$300 million to power companies that take the fuel.

Eighteen electric utilities with more than three dozen reactors -- including the Palo Verde Generating Station, which is partly owned by the Public Service Company of New Mexico -- have expressed interest in accepting the fuel for disposal, O'Leary said.

No American commercial reactor currently uses plutonium-based fuel, known as mixed-oxide or MOX fuel. The fuel was abandoned in 1977 in the United States as part of a policy of not mixing military and civilian nuclear programs, although MOX is used in some European reactors.

Also, the production of MOX fuel and depleted uranium oxides will require industry contractors to build roughly \$1 billion in new factories.

The factories probably will draw partly on European expertise in making mixed-oxide fuel but also on Los Alamos experiments on turning plutonium pits, which contain gallium, into nearly pure plutonium oxide. The lab produced the first mixed-oxide fuel pellet from the pit of a nuclear weapon in June 1995.

Environmentalists criticized the DOE's decision to burn some plutonium as mixed-oxide fuel as a form of welfare to the beleaguered nuclear-power industry.

"This is a decision about the energy basis of our civilization and who will profit," Mello said.

Quick Lab Cleanup Pushed

Critics Claim Plan Will Only Scratch the Surface

8/25/97

By IAN HOFFMAN
Journal Staff Writer

ALBUQUERQUE — The environmental chief for the U.S. Department of Energy labored Tuesday to sell the public on a faster cleanup of pollution left over from the Cold War heyday of nuclear weapons production.

DOE Assistant Secretary Al Alm is banking that his plan's promise to get the job done by 2006 will rejuvenate flagging support in Congress for nuclear cleanup.

With a steady \$6 billion a year, Alm said, Sandia National Laboratories in Albuquerque can be cleaned up by 2001 and Los Alamos National Laboratory, by 2005.

"We're actually getting to the point where we're seeing the end," Alm told reporters during meetings here at the Indian Pueblo Cultural Center.

But Alm's "Accelerated Cleanup" plan has met stiff resistance from a constituency that ought to be an easy sell — environmentalists.

"Accelerated cleanup in some ways means not doing cleanup, and that's not acceptable to some folks," said Don Hancock of the Southwest Research and Information Center in Albuquerque.

Millions of cubic feet of hazardous and radioactive wastes would remain buried at LANL under the plan, noted Greg Mello, head of the Los Alamos Study Group in Santa Fe.

"The lab is not permanent, but the waste it produces is permanent. A thousand years from now someone here will have to take care of all that waste. It's not all going to get shipped to WIPP," Mello said, referring to the deep salt mines of the Waste Isolation Pilot Plant near Carlsbad.

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DOE Pushing Quick Lab Cleanup

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Environmentalists say the plan's finer print reveals several shortcomings:

■ DOE's deadlines and budget are for surface cleanup only. That primarily means digging up and hauling away some, but not all buried wastes. Or merely "capping" the waste pits with clay umbrellas to prevent rainwater from carrying off radioactive or hazardous toxins. What's missing is groundwater cleanup. Shallow groundwater in one Los Alamos canyon shows radioactive contamination above drinking-water standards.

"You can't say you're cleaning up if you're not doing groundwater," Hancock said. Alm and John Arthur, the top DOE

environmental executive in Albuquerque, said radioactive contamination in groundwater is harder to clean up, but DOE does plan to do it eventually.

"We are not just doing surface cleanup and then walking," he told reporters.

■ DOE backed off having the U.S. Environmental Protection Agency set radioactive-waste cleanup rules for Energy and Defense Department sites. Without national standards, each DOE facility can pronounce a site "clean" when different levels of pollutants still exist there.

"You don't want a radioactive site turned over and an elementary school or a high-density housing development built there," said environmental lawyer Mike Veliuva,

counsel for the Western States Legal Foundation in Walnut Creek, Calif.

"It's the crux of the problem: How does one decide how clean is clean? Certain sites will get cleaned up, others will be ignored due to socioeconomic reasons," Veliuva said.

■ DOE's plan puts high priority on clearing sites off its list by declaring them "no further action," as LANL has done with nearly 900 of its 2,100 sites.

Alm's office, for example, wants to base the largest, single measure of environmental performance at the Los Alamos lab on how many polluted sites are declared "no further action."

To environmentalists, this smacks of a paper cleanup rather than getting rid of contaminants.

■ The plan doesn't spell out how DOE will get more work done than in the past, when its cleanup program generated more paperwork and jobs than cleaned up sites. Veliuva calls it "a federal jobs program at the expense of a lot of trees."

One of the more glaring examples is at LANL, where DOE investigators this year found that only a fifth of the lab's cleanup budget from 1991 to 1996 was used for site cleanup.

The DOE's Arthur said Los Alamos has done more actual cleanup over the last two years.

"Are we there yet? I think we've still got some efficiencies to gain," he said.

LANL Celebrates New Waste System

Treatment Removes Radioactive Particles

By IAN HOFFMAN
Journal Staff Writer

Every working day, scientists drop an average 20,000 gallons of radioactive liquid into drains at Los Alamos National Laboratory.

By dribs and gushes, this soup runs in a network of 1,600 pipes to an aging treatment plant.

What later flushes into Mortandad Canyon has exceeded federal radioactivity guidelines for seven years, occasionally up to 15 times the limit.

LANL's top waste manager declared those days nearly over Tuesday. If all works as designed, a new technology of reverse osmosis and spinning "ultra" filters will start scouring the discharge in late January. Plutonium and many other

"hot" particles will be removed to vanishingly tiny amounts, about a tenth as radioactive as, well, beer.

"I want to be the first to drink a glass of this water in January," said a glowing Tom Baca, LANL's director of environmental management.

Spectators at a ribbon-cutting for the upgraded liquid waste plant got a "fact sheet" stating the new equipment "will treat and discharge industrial waste water in accordance with all federal, state and local regulatory requirements."

In truth, it won't. And Baca's drink still will be a cocktail of radioactive and chemical wastes, with five times the state drinking-water standard of one pollutant.

The new technologies could bring the lab into compliance with the U.S. Department of Energy, which owns the lab and regulates radioactivity in its liquid waste.

But the plant will not meet state pollution regulations. And the state



TUBULAR ULTRAFILTER: Steve Hanson, with LANL's Environmental Management, talks about the new Tubular Ultrafilter that will be used to filter some of the radioactive elements from the lab's waste water.

EDDIE MOORE/JOURNAL

Department is far from satisfied with the lab's delay in proposing a treatment for nitrates.

"I would say we're concerned," said NIMED spokesman Nathan Wade. "We're contemplating an enforcement action at this moment."

still wants LANL to propose ways to deal with 35 years of discharge into Mortandad Canyon. Almost 50 million gallons of liquid waste have contaminated the canyon's shallow ground water to above state or federal standards with nitrates, tritium and radioactive strontium-90.

And the New Mexico Environ-

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LANL Celebrates New Waste System

from PAGE 1

Baca's glass also could contain radioactive tritium at levels up to 75 times the federal drinking-water standard, depending on lab activities that week (Via an odd loophole, the tritium is technically not regulated because it was produced in a reactor, not an accelerator, even though both kinds pose exactly the same health hazard in drinking water.)

Baca can drink his water without fear — the standard is based on 70 years of daily guzzling. But he probably shouldn't share his glass with an infant.

The water would be rich in nitrate. For infants, long-term ingestion of nitrates can block oxygen uptake and cause "blue-baby syndrome."

That's what worries state regulators about the lab's waste water. In its attack on nitrates, the state's

waste group.

This leaves LANL with no clear plan for treating nitrates, after getting state regulators to agree to at least three delays to come up with such a plan.

"We're looking at short-term options for hitting the nitrate mark," said Joe Vozella, assistant area manager of the environment for the DOE.

Such "quick and dirty solutions," as one lab official put it, would include simply diverting the nitrate-contaminated waste water to a storage tank and gradually concentrating it so more could be added to the tank.

This in theory could buy the lab another 16 months to devise a treatment plan, if the idea placates state regulators.

"Hopefully, I hope we're showing good-faith efforts to come into compliance," DOE's Vozella said.

"I don't know what to expect from

the state," said the lab's Hanson.

Environmentalists are fraile at the lab's continuing pollution of Mortandad Canyon and its shallow ground water. No one is certain whether any is filtering 700 feet down to deeper ground water used for drinking water.

"The laboratory has missed several deadlines. When are they going to meet one? It's not a mom and pop operation," said Greg Mello of the Los Alamos Study Group in Santa Fe. "Mortandad Canyon is a mess, they should stop making it worse and start cleaning it up."

Baca's ultimate vision is "zero discharge" to the canyon: All liquid radwaste would be treated and fed back to LANL facilities for reuse, for example as cooling water. A June 1998 lab study recommends "zero discharge" but says it is 5-10 years away.

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LANL Plans Waste-Site Caps; Group Fears Fed Fund Cutoff

Ian Hoffman Journal Staff Writer

The federal nuclear-weapons laboratory at Los Alamos is planning to propose capping its worst dumps for tons of radioactive and hazardous wastes dating to the Manhattan Project.

The caps, often made of clay or synthetic mats, are designed as shields against rain and snowmelt that erode the dumps or leach the wastes into ground water.

A new report by a Santa Fe nuclear disarmament organization, the Los Alamos Study Group, found the lab's 24 dumps contain roughly 17.5 million cubic feet of toxic metals, radioactive elements, hazardous chemicals and explosives.

That's nearly three times the ultimate capacity of the Waste Isolation Pilot Plant, a nuclear-weapons waste burial site near Carlsbad.

In its report Thursday, the Los Alamos Study Group suggested lab officials are spending vastly more money on studying cleanup, rather than digging up the wastes.

"This lack of action persists despite the expenditure by the LANL Environmental Remediation program of more than \$500 million in the past 10 years," wrote Michael Beatz, a research intern for the study group.

Lab officials challenge the report's assertion that LANL has "no definite plans or commitments to stabilize or remediate" its 24 worst dump sites.

"That's absolutely false," said lab spokesman James Rickman. "Right now, we're going to put a cap on all these sites until we know what the final remedial measure will be."

That still worries lab critics. They fear cleanup of other U.S. nuclear-weapons sites, such as Rocky Flats near Boulder, Colo., will leave Los Alamos without enough federal money to get rid of more than 50 years of buried wastes.

"Are we just wasting our opportunity to do cleanup?" asked Greg Mello, the study group's leader. "Will Congress wake up and say 'You've had enough money, now we're cutting it off?' We don't want that to happen."

LANL's largest and most complicated dumps are known as Material Disposal Areas, or MDAs, for short. They usually are shafts, pits or trenches, mostly unlined, and they represent the lab's most intractable cleanup problems. In some cases, lab officials do not know for certain what the older

dumps contain.

So far, lab-cleanup officials have focused on more than 1,000 of the lab's easier cleanup sites. Many sites had been wrongly identified and turned out not to be actual waste sites at all; at others, the sources of pollution could be contained or removed fairly easily. But the vast majority of LANL's cleanup money has gone to studies and management of the program.

A 1997 U.S. Department of Energy study found only about 21 percent of the lab's cleanup spending from 1991 to 1996 went toward cleanup.

Lab officials remain uncertain about what to do with several hundred remaining sites, including most of the material disposal areas. Of the MDAs, LANL has firm plans to dig up the contaminants at only one such dump, called MDA P, that was used for 40 years to dispose of explosive residues and metal wastes from explosives testing.

Within a few weeks, lab officials will present a plan to New Mexico environmental regulators for capping the other MDAs, leaving the waste in place while they study what to do with it, Rickman said.

A state environmental study found two-thirds of the MDAs pose "moderate" to "high" risk of seeping contaminants into ground water. Neither the lab nor its owner, the U.S. Department of Energy, plan to perform any ground-water cleanup at Los Alamos.

Report: LANL's buried waste outdoes WIPP

7/30/92
S.F.
New
Mexican

► *Anti-nuclear group says that 17.5 million cubic feet of radioactive waste is stored or buried at Los Alamos lab*

By **BARBARA FERRY**
The New Mexican

Los Alamos National Laboratory has nearly three times as much radioactive waste stored or buried on site than will be buried at WIPP when it is full, a report by a local anti-nuclear group contends.

However, laboratory spokesman James Rickman said the report is an "apples and oranges comparison" because most of the waste buried at the lab is less dangerous than the waste slated for WIPP.

The Los Alamos Study Group of Santa Fe examined 24 waste sites at the lab, including Area G — which has been used as the lab's main dump for waste since the 1950s.

The report says there is 17.5 million cubic feet stored or buried at the lab sites, compared to the 6.2 million cubic feet which is slated to end up at the Waste Isolation Pilot Plant near Carlsbad. WIPP, which

opened in March, is the Department of Energy's planned repository for transuranic waste from the weapons complex sites around the country. DOE expects it will take 35 years to fill up WIPP.

At WIPP, waste is buried 2,150 underground in salt beds believed by DOE to be impervious to outside elements, while waste at Area G is buried in shallow pits, the report states.

The lab's waste sites contain at least 100 pounds of plutonium, a million curies of tritium, tons of hazardous waste and other contaminants and a variety of other radionuclides and contaminants, according to the study group's report.

The waste going to WIPP is called transuranic waste, which is uranium-or plutonium-contaminated waste that, because of its long half-life, must be isolated for many years. Rickman said that since 1970, all transuranic waste at the lab has been kept in retrievable storage, to be held there until a repository opened.

Most waste buried at Area G and other LANL sites is low-level waste. Most low-level waste is short-lived and has low levels of radioactivity. However, environmental groups say some waste in this category presents a greater radiation hazard than

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transuranic waste.

Transuranic waste generated prior to 1970 is buried at Area G, Rickman said. Area G is reaching capacity and the lab plans to expand the 63-acre site by 30 to 66 acres, Rickman said.

The lab will continue to bury waste at the site until 2044 when it will be covered with 6 to 10 feet of earth, he said.

The study group also criticizes the lab's efforts to clean up dump sites, saying that despite spending \$500 million during the past 10 years, the lab has done little to actually clean up any waste.

The report says there are no plans to clean up or stabilize waste sites at the lab and that 16 of the dumps are classified by the New Mexico Environment Department to pose a moderate or high risk of long-term groundwater contamination.

But Rickman said the lab is negotiating with the New Mexico Environment Department on how to remediate waste sites.

"That's absolutely incorrect that we have no plans to remove or stabilize these sites," he said. "But until the environment department approves plans for corrective actions, it's not appropriate for us to go in there and start digging them up."

High explosives which contaminate one dump site are being removed, he said.

"I think the lab would say it has made substantial progress on (clean up)," Rickman said.