

Santa Letters

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'Nuclear Waste in America'

(See special Sunday supplement)

Christmas Secrets

(See cover page, section 'B')

Alternative school long time in making

By KIM THOGMARTIN
Staff Writer

"This is our way of saying we are not going to give up on the student."

Mal Manchee, director of program development for Hereford Independent School District, looked around the main classroom at the alternative school. Located at 140 W. 4th Street, it is the newest special program for HISD, one that has been at least four years getting off the ground.

"The Panhandle Regional Planning Commission approved us for the funds four years ago, but it just wasn't the right time to get it going. This year the money became available again through the State Criminal Justice Division and we were able to get it going."

"The alternative school is for the student who is having a difficult time adjusting to

the regular school setting," explained director Glen Powell. "Enrolling in the program is a choice the student makes on his own, and we must have the initial involvement of the parent."

Powell, who has worked previously in alternative schools and also in penal education programs, receives assistance from Yolanda Tarango a teacher aide. "She is closer to their age and has a great rapport with the students," Powell said.

Powell holds a bachelor's degree from Texas Wesleyan and a master's form Memphis State University. He has taken postgraduate classes at

Sam Houston and Le Mar Universities, Southeast Missouri State and the University of Southern Illinois.

He most recently taught at Ocala, Fla., where he was the DeMolay chairman and chapter dad. DeMolay is a Masonic-sponsored organization. Tarango has a degree from Amarillo College and is working toward a diploma in bilingual education.

Manchee stressed the alternative school is different from the Special Assignments Center (SAC), which serves as a short-term, in-school suspension. Students who choose the

alternative school plan to be there for a while. In fact, Powell is hoping the older students will finish out the school year and qualify for general education degrees.

"I stress attendance," Powell commented. "One of the main reasons these kids had problems at HHS is their lack of attendance. My 11 students average 85 percent attendance now. Before it was around 40 percent."

"This is first and foremost an educational program," Powell stressed. "Although the curriculum is different, I am still there to teach." The program is limited to 12 students with the 11 now enrolled.

"The thing that has surprised me the most is the support the school has received," Powell said. "Everywhere I have looked for help, from families to fellow educators to the general public, people have cared."

Manchee said the new school differs from other HISD facilities in that corporal punishment is not used. "For many of these students it has not been effective in the past, so why keep using it? We lean more to motivation than punishment."

Weightlifting equipment is provided in a separate room where the kids can go to burn off energy. Powell also provides educational "toys" such as video equipment, which serve as learning tools and to reward good behavior.

"Our primary aim," Manchee, said "is to get the student back into the regular classroom setting as quickly as we feel they are ready. If that seems impossible, we work toward getting the GED."

"Job market preparation is important to me," Powell added. "In fact, I have made a personal commitment to these kids to help them get a job that has a future when



they graduate or get their GED.

Powell said he welcomes involvement from the community in the way of special educational programs or practical workshops, such as woodworking or mechanics. Interested volunteers can see Manchee to schedule a visit.

"The community response has been far more rewarding here than anywhere I have taught," Powell concluded. "People in this part of the country really are more concerned about each other."

(See picture on page 2A)

HISD wants to show it won't give up on students

The Hereford Sunday Brand

Dec. 18, 1983

83rd Year, No. 119, Hereford, Tx. Deaf Smith County

44 Pages Plus Supplements

30 Cents

Sunday's Local Roundup

Henderson dies Saturday

Calvin Henderson, 32, died from numerous internal injuries at approximately 6:30 a.m. Saturday in Deaf Smith General.

James Bullard, DSGH administrator, said Henderson expired in the hospital's intensive care unit. He was admitted a week ago Friday after having been shot from close range in his right side, apparently by 52-year-old Gene Wiggins of Dimmitt. Wiggins later caused the death of Polly Woolbright, 51, before killing himself.

Henderson, the son of Woolbright, lost consciousness Monday when he lapsed into "extremely critical" condition. He spent the rest of his life in intensive care with a life-supporting machine connected.

His stepfather, 40-year-old Lewis Woolbright, also received extensive shotgun wounds to his right side on Dec. 9. Bullard said Woolbright was in "stable" condition Saturday morning, continuing to improve.

Eleven locals pass exam

Eleven Hereford women were recently notified they passed a state board examination taken in October, an Amarillo College press release claimed.

Each local graduated from the AC vocational nursing course. They are Juanita Casarez, Robin Craig, Jan Emerson, Cynthia Jackson, Elizabeth Kiper, Raquel Nanez, Billie Polk, Dena Puckett, Glenda Schueler, Jean Warden and Olga Zamora.

The AC pass rate was 91 percent, according to Sue Ann Hicks, chairman of the program. Students graduating from the program this fall qualify to take state board examinations April 10 in Fort Worth. Those who pass that test are to be certified as licensed vocational nurses.

Applications are now being accepted for the spring semester's program, to begin Jan. 16. Regular registration in Hereford is set for Thursday, Jan. 5 from 7 to 8 p.m. in the Hereford High School cafeteria.

Supplement public service

Today's edition of The Hereford Brand includes a special section printed and published by The Philadelphia Inquirer.

Entitled "Forevermore: Nuclear Waste in America," it deals with the problems of disposing of radioactive nuclear waste in this country.

The supplement is included as a public service by the

Brand. The Inquirer granted permission to use the section, and the following local firms and individuals helped underwrite the printing costs: Garrison Seed Company, Hereford Grain Cooperative, Hi Plains Industries, Farmers Elevator of Dawn, Schlabs & Hysinger Commodities Service, Harold Dillehay, Troy Sublett, Carl Kleuskens and Pat Smith.

'Woman' nominations start

Members of the Women's Division of the Deaf Smith County Chamber of Commerce are now in the process of accepting nominations for Woman of the Year.

The lady selected for the honor is to be announced at the January quarterly meeting, when installation of officers is also scheduled to take place.

Anyone may submit a nomination and the only requirement is that the nominee be a member of the women's division. Deadline for submitting names is Dec. 27.

HISD enrollment still up

Enrollment in the Hereford Independent School District for this year, as recorded Dec. 12, is still ahead of the 1982-1983 figures.

Last Monday, HISD showed a total enrollment of 4,830 students. Though that is down from the 4,843 recorded one week earlier, it is 49 students more than attended area schools as of Dec. 13, 1982.

Northwest continued to be the most-populated elementary school, with 452 kids of first-through-third-grade-age roaming its halls. Fourth-through-sixth-grade Shirley had just 336.

La Plata held the junior high school advantage: 594-556 over Stanton. Hereford High School had 934 students as of Monday.

Two injured at Swift

An ambulance was dispatched at midday Friday following a cleaning accident at Swift Independent Packing on W. Highway 60.

Paramedic Rex Lee of Deaf Smith General Hospital said Rudolph Ortega, 47, and 30-year-old Ramiro Cortez were putting a cleaning powder into a tank to clean it when the substance blew back at them.

Ortega received caustic alkali burns to his upper body and was transferred by ambulance to High Plains Baptist Hospital in Amarillo because local doctors were concerned about possible damage to his eyes. Lee said Ortega was able to see when he left Hereford but his vision was slightly blurred.

The younger man was treated and released at Family Medical Clinic with first-degree burns to his chest.

Ortega is from Portales, N.M., and Cortez lives at 109 Pearl in Hereford.

Four nominated for honor

Four West Texas State University students from Hereford are among 52 WTSU nominees chosen for the 1984 edition of "Who's Who Among Students in American Universities and Colleges."

They are Pam J. Brorman, junior business education major; Ruthann Hoover, graduate student in nursing; Willa Bess Lawson, a senior majoring in computer information systems; and Barry M. Morgan, senior biology major.

A committee of WTSU faculty and staff members along with administrators selected the four after they were nominated by campus organizations and academic departments. Considered were academic achievement, community service, leadership in extracurricular activities and potential.

The WTSU nominees are to be included in the 1984 volume with students from 1,500 institutions of higher learning in all 50 states, the District of Columbia and several foreign nations. Outstanding students have been honored in the annual directory since 1934.

Commissioners to gather

Hereford City Commissioners have slated a regular meeting at 7:30 p.m. Monday in the city building, 224 N. Lee.

Only one item faces the commission: appoint a member to the juvenile probation board. Dudley Bayne, city manager, said he would also present commissioners with a budget report, which requires no action.

Care of handicaps costly

Mr. and Mrs. L. have eight children, the youngest being one-week old and born with a severe handicap. The baby will require surgery soon and probably further surgery in the future.

Mr. L. is a farm laborer and can find only seasonal work, and he is presently working out of town. A home

Christmas Stocking Fund

health care nurse has requested help for the family at Christmastime.

Cases like this are what the Christmas Stocking Fund program is all about. A group of anonymous citizens started

the non-profit program to help needy families here at Christmas time.

Contributions to the fund can be made at The Hereford Brand office, or by mailing them to Box 673, Hereford, Tx. 79045. Those who know of needy families can take the information, or mail it, to Room 101, Deaf Smith County Courthouse.

Names of donors are published in The Brand. The CSF used approximately \$8,500 in donations last year to help make Christmas brighter for the less fortunate.

Mr. and Mrs. L.R. Coatsworth	100
Jake & Sam White	5
Anonymous	100
Jimmie & Mary Allred	50
Mr. and Mrs. Henry Brorman	25
Anonymous	100
Mr. and Mrs. E.W. Dettmann	150
Women of St. Thomas	25
Episcopal Church	25
Mr. and Mrs. Donald R. Foster	25
Anonymous	10
Hereford Ministerial Alliance	50
Betty Dickson	25
Mr. and Mrs. Dave Hopper	100
Champion Feeders	200
Edward J. Bezner	5
Anonymous	25
Mr. and Mrs. Ewald Berend	25
Anonymous	50
Mr. and Mrs. Earl Lewis	20
TOTAL TO DATE:	\$5,622.70

Previous Total:	\$2,847.70
Mr. and Mrs. James E. Pavlicek	25
Anonymous	10
McCaslin Lumber Co.	100
Anonymous	100
Claud McGowan	25
Masonic Lodge	300
Nettle Station Circle,	
First United Methodist	
Church	125



That feller on Tierra Blanca Creek says too many people know all the answers.

ooo

A good rule of the road—especially in weather like we've had the past two days—is to let the other car get there first.

ooo

The snow Friday emphasized the fact that winter is here, and also served to remind us that Christmas is just a week away. Whether you like the snow or not may depend on your age, and whether it makes you money or causes you to lose.

Merchants probably wouldn't care if it snowed for several days and closed the roads out of town. "Shop at Home" would sure be more than a slogan, then. Most farmers are happy to see any kind of moisture, anytime, but feed yard operators probably hate the fluffy white stuff, because it really creates problems for them!

Most kids, we suspect, love the snow. For mom, however, it creates many additional problems to running a household. Most of us are always talking about the weather, however, and it sure adds ammunition for those conversations!

ooo

If you've got good friends, they'll help keep you humble if you attain a position in the community, are honored by fellow citizens, or if you're elected to a public office. This thought crossed our mind when we saw a small sign hanging in Emory Brownlow's office:

"Once a man holds public office, he is absolutely no good for honest work."—Will Rogers

Brownlow said his mother gave him the sign when he was first elected to Hereford City Commission. Although the famed Will Rogers probably was referring to Washington politicians, Brownlow says the sign serves as a conversational piece and "reminds me not to take myself too serious."

ooo

A wealthy lady loved to read a certain magazine because each month it gave the details of a rare new disease. She immediately imagined she was suffering from it herself.

Several doctors were making a handsome living out of her supposed symptoms. But while in Maine for the summer, she suddenly ran into one old country doctor who wasn't having any of the nonsense.

"You couldn't possibly have this disease you say is destroying you," he told her gruffly. "In the first place, if you did have it, you'd never know it because there is absolutely no pain or suffering whatever!"

"There, you see!" said the lady triumphantly, "those are my symptoms precisely!"



Quite A Collection

Sixth graders from Shirley Elementary School presented an hour-long program Thursday afternoon which included the above sketch.

Shown from left to right are Mason Morgan, Toni Campbell, Felipe Munoz, Ricky Cantu and Yvonne Padilla.

News Roundup

State

FBI wants help in heist case

FORT WORTH, Texas (AP) — A man and a woman who work as a team have robbed small-town North Texas banks of \$1 million over 13 years, becoming a "thorn in our side," says an FBI agent who hopes public exposure will help snare the modern-day Bonnie and Clyde.

The couple is believed to be responsible for 14 bank robberies since 1970, said FBI Agent Darrell W. Shaver. The most recent occurred Nov. 4 at the Fannin Bank in Windom, Fannin County.

"We're dealing with suspects who are very professional," said Shaver. "They're a thorn in our side; they have been for 13 years."

Shaver said the two listen to portable police scanners and usually wear ski masks, cowboy hats, gloves and bulletproof vests during the heists. For their last two robberies, they attached a metal, bullet-proof shield behind the seat of their getaway car.

Shell president optimistic

HOUSTON (AP) — Americans can look forward to plentiful energy supplies and stable prices in 1984, which should be a year of good economic growth, Shell Oil Co. President John F. Bookout says.

"The United States has considerably tamed its appetite for energy and particularly for oil," Bookout said Friday at a year-end briefing. "We would think we're beginning to see some kind of turnaround. What I don't know the answer to is how fast the recovery is going to take place."

"You have a situation in which there has been a rather massive reaction and readjustment to the changing conditions in the energy business in the last 18 months," he said. "Everyone is reasonably efficient at the present time. So they won't do much about staff additions and building new facilities until they get the ones they have fully utilized."

State, Manges receive \$500 million

AUSTIN (AP) — Texas and rancher Clinton Manges have agreed to accept more than \$500 million in an out-of-court settlement of a \$1.7 billion lawsuit against Mobil Oil Corp.

The long, involved controversy over oil production on Manges' Duval County ranch was settled Friday.

"The settlement was arranged to avoid continuing costly litigation," said a statement issued shortly after noon by Attorney General Jim Mattox, Land Commissioner Garry Mauro, Manges, and Mobil.

Under the agreement the state will get "well in excess" of \$100 million, while Manges' Duval County Ranch Co. will get "well in excess of \$400 million, according to a reliable source, who asked not to be identified."

National

Woman cries as plea denied

RIVERSIDE, Calif. (AP) — Cerebral palsy victim Elizabeth Bouvia wept at the news that a judge had denied her request to starve to death in a county hospital, but her attorneys vowed to fight in higher courts for her wish to die.

"We're fully committed to going the full route on this case," said attorney Richard Scott, who relayed word of Friday's decision by telephone to Ms. Bouvia at Riverside General Hospital.

"She was crying," he said. "She was disappointed." Scott, who represented Ms. Bouvia under the auspices of the American Civil Liberties Union, said, "It may be that this case will have to be decided by the California Supreme Court."

International

At least 64 die in fire

MADRID, Spain (AP) — A raging fire early Saturday in a crowded downtown discotheque killed at least 64 people and injured scores of others, rescue officials said.

The fire apparently started when sparks from an electrical short circuit set curtains in the Sala de Fiestas Alcala 20 club, according to initial reports and firefighters on the scene.

Radio reports indicated there may be more dead inside the smoldering basement discotheque where about 1,000 people were dancing when the fire broke out.

One survivor told reporters most of the victims perished because they were unable to make it up the stairs because of the heavy smoke.

Many perish in London blast

LONDON (AP) — A bomb exploded in Harrods department store at lunchtime Saturday, and the London Ambulance Service said it had an unconfirmed report "that there are 14 dead."

The London Fire Brigade earlier said 24 people were injured.

A spokesman for the ambulance service said its report came from Scotland Yard. All telephone lines to the Yard police headquarters were jammed, and the report could not be independently confirmed.

A spokesman for the Fire Brigade said 10 percent of the world-famous store was damaged, from the ground floor to the fourth floor. He said 24 cars in the street were damaged.

There were conflicting reports on how many bombs were involved. A Harrods official said the bomb was inside the building, and a Scotland Yard spokesman said a car-bomb was involved.

Riot police clash with marchers

GDANSK, Poland (AP) — Riot police, braced for confrontations with demonstrators honoring workers killed during food price riots 13 years ago, clashed with thousands of marchers in several Polish cities.

But the turnout at the marches Friday, called by the underground leadership of the outlawed Solidarity trade union, was smaller than in past protests.

Police dispersed throngs of demonstrators here and in Warsaw, Poznan and Wroclaw. There were clashes in Gdansk, Poznan and Wroclaw, some occurring before or after Masses at Roman Catholic churches.

An undetermined number of arrests were made, but no injuries were reported.

The demonstrations also were to protest the suspension and subsequent banning of Solidarity when martial law was imposed Dec. 13.



School Head

A local resident designed this unique desk for Glen Powell, director of the alternative school. Students are gathered around him in a semi-circle so that he can offer immediate attention to problems with school work.

Inmate earns education

By KEN HERMAN
Associated Press Writer

AUSTIN (AP) — For eight years the Texas Board of Pardons and Paroles refused to let Benjamin Lach out of a murder sentence that could have kept him in prison until the next century.

Bureaucratic language in board records says Lach should not be freed because of the "nature and seriousness of offense."

Newspaper accounts of the crime are more descriptive. Lach, then a Texas Tech graduate student, used a scalpel to kill Sarah Ellis Morgan on Dec. 4, 1967, in Lubbock. The 54-year-old cleaning woman happened on Lach while he was stealing science exams.

Despite Parole Board votes against freedom for Lach — who was serving 40 years — the 44-year-old Polish native walked out of the Texas Department of Corrections on Oct. 28, 1983. Thanks to Texas "good time" laws, Lach built up 40 years of credit in 15 calendar years.

Lach, editor of the prison newspaper and winner of several prison publication writing honors, also benefited from a 1983 law aimed at offering good time (time off for good behavior) as an incentive for inmates to complete educational or vocational programs behind bars.

While incarcerated, Lach earned two degrees from Lee College of Baytown, and two from nearby Sam Houston State University. Lach's educational achievements probably cut 16 months off his prison stay, according to Sen. Bob McFarland, R-Arlington and sponsor of the bill. Because Lach's conviction predated a 1977 change in the law, on Oct. 28 he became a completely free man. He is not under "mandatory supervision" now required for inmates who are released early.

Lach left Huntsville and moved back East. McFarland acknowledges he has fielded a few questions from people concerned about the bill's effect on Lach.

"Were I king for a day I'm not sure I would have sentenced him to only 40 years in prison, nor would I have affected his release, but that's personal," said McFarland.

"I would say the fact that Benjamin Lach was released a year and a half early because of the application of the education good time program certainly isn't to me any basis for rethinking the

purpose of the program," he said, adding that the 15 years served by Lach is longer than usually served on a 40-year term.

But Sen. John Montford, D-Lubbock, said he wants to review the program. Montford voted for the McFarland bill, but now has some problems with it. The Lach case — an emotional one in his district — is one of the problems.

"I really don't have any problem with the spirit of the bill," he said. "But I would hope we don't make it a matter of course to let out violent cutthroats just because they get a college degree."

The new law does not bar violent offenders from picking up good time for educational achievements. The measure refers only to "an inmate."

McFarland said there was never any question that the bill was to apply to all inmates.

"If you're talking about whether a guy who gets mad and hits somebody over the head with a tire tool is impossible of rehabilitation, while a four-term burglar is, that doesn't make any sense to me," he said.

Pauline Sullivan, director of the inmate lobby group CURE, also said it's nonsense to rehabilitate selectively.

"The programs are not supposed to take into account why the prisoner is there. You don't just rehabilitate a prisoner whose crime is less heinous than others," she said.

Lach piled up good time at close to the maximum rate, according to TDC spokesman Rick Hartley, who said Lach had a "clean record."

TDC awards good time for education on an automatic basis. If an inmate completes a course of study, he gets the time off. As with all good time, it can later be revoked for infractions.

Hartley also said the incentive program is offered to all inmates, regardless of the nature of their offense. House Law Enforcement Committee Chairman Ray Keller, R-Duncanville, says every six hours of college credit earned by an inmate increases by 50 percent the chance that the inmate won't return to prison.

Montford said, "I think there's a definite correlation between recidivism and higher education. I just don't think (the time off for educational achievements) ought to be automatic."

"Lach is an extremely intelligent fellow. That doesn't

make him less of a threat to society," he said. "He was undoubtedly a model prisoner. That was the environment he functioned best in."

Montford, a former district attorney, said he was "irked" that no one in Lubbock was told of Lach's release before it happened.

"Many people out here are still concerned for their safety," he said.

John Byrd, executive director of the Board of Pardons and Paroles, said Lach's parole hearings drew great attention from Lubbock.

"We would just get bombarded with correspondence from Lubbock. It was very much on the minds of the Lubbock community," he said.

Indeed, parole board records show "protests" as one of the reasons Lach was turned down for parole. The board voted against Lach's release every year since the first review on May 10, 1976.

But Byrd said there also was support for Lach's release.

"He was one of the few Jewish inmates in TDC and he had very strong backing from the Jewish community in Houston," he said.

Hartley said it's too early to tell if the new law has attracted more inmates to the classroom. As of Nov. 30, 6,846 inmate records had been "acted on" to reflect the new good time law.

"You'd have to make the assumption that it would certainly behoove an inmate to get involved in an educational program," he said.

Still, there are those in Lubbock who are not impressed with trading class time for prison time. The Lubbock Avalanche-Journal, in a Nov. 3 editorial, complained about the "surprise release of Benjamin Lach."

"Most law-abiding citizens expect tougher and longer sentences, especially in serious crimes. And they expect such sentences, once given, to be carried out, not made a mockery of by judges, lawyers or legislators circumventing the intent of the juries and judges who pronounce the sentence."



Departure of PLO loyalists starting

By MONA ZIADE Associated Press Writer

TRIPOLI, Lebanon (AP) — International Red Cross workers Saturday began evacuating about 100 seriously wounded PLO loyalists, putting them aboard an Italian ferry after Israeli gunboats bombarded this northern port.

The wounded fighters are the first of an estimated 4,000 Palestinian Liberation Organization guerrillas to be evacuated. The fighters loyal to PLO chairman Yasser Arafat have been trapped for the past month by mutineers trying to oust Arafat.

In Beirut, officials reported a newly proclaimed ceasefire was holding Saturday. Spokesmen for the U.S., French, Italian and British contingents of the multinational peacekeeping force

said there was no violence in their zones Friday night or Saturday morning.

Tripoli residents and PLO officials loyal to Arafat said Israeli gunboats fired a 20-minute barrage from offshore at 5 a.m. (10 p.m. EST Friday). There were no reports of casualties or serious damage.

At 8:30 a.m., the Italian ferry Appia, carrying Red Cross nurses and doctors, entered the port and within an hour began evacuating the wounded guerrillas to Larnaca, Cyprus.

Five Greek passenger ships, flying United Nations flags, sailed Friday for Tripoli to pick up the bulk of Arafat's fighters. That evacuation is expected to begin Monday.

Arafat toured the Palestine Red Crescent hospital before the evacuation began, kissing and hugging the wounded there scheduled to board the Appia.

"Don't you worry. All will be okay," he told 20-year-old Mohammed, a guerrilla paralyzed from the waist down who also has serious wounds in his abdomen and back. "I will make sure you get the best treatment."

The PLO chairman then went to the port to inspect the Appia.

The guerrilla leader, under siege from Syrian-backed rebels who want to oust him from the PLO leadership, agreed to the evacuation, which is intended to spare Tripoli, Lebanon's second largest city, from further fighting.

Program's orders taken

Orders are now being taken by the Tierra Blanca Soil and Water Conservation District for the annual tree windbreak program.

Jaime Neepser of the Soil Conservation Service in Hereford said the district for the first time ever will have pecan seedlings available.

The district gets the trees, evergreens and shrubs from the Colorado State Forest Service, either potted or in bare root form.

Evergreen trees that may be ordered this year include Austrian Pine, Ponderosa Pine and Eastern Red Cedar, which is a fast-growing evergreen.

Potted evergreens will cost \$40 for a lot of 30, with a minimum order of 30 trees. Neepser said the trees should be four to 10 inches tall.

The evergreen varieties are also available as bare roots, in lots of 100 which cost \$40. There is a minimum order of 50 of one variety.

A minimum order of 100 is required for bare root trees chosen from a list that includes Chinese Elm, Hackberry, Honey Locust, Russian Olive, Poplar and

Ash. Those trees also cost \$40 per 100 and there can be no less than 50 ordered of any variety.

Neepser said the trees are all well-adapted to this climate and will be 10 to 30 inches tall.

Shrubs also cost \$40 per 100 and the landowner can choose from lilac, plum, sumac or sand cherry. Neepser said the Nan King cherry can be ordered but it is more suited to higher elevations.

Tierra Blanca claimed the trees are to be purchased only for use as windbreaks and cannot be resold or used as an ornamental plant. There is no longer a minimum acreage requirement for eligibility.

The trees are to be delivered on March 28 with sign up continuing through March 1. Money is due when the order is placed at the Soil Conservation Office and Neepser said applications are accepted on a first come, first served basis. There are limited quantities of some trees.

Pecan trees will be sold for \$9 each with no minimum order required. They are expected to be 3-year-old trees

of ¼- to ¾-inch diameter. The two varieties, which are adapted well to this region, are Wichita and Western Schley. The Wichita Pecan is paper shelled and produces in the fourth or fifth season. Western Schley also has a large paper shelled nut and should produce in the third or fourth season.

Neepser said some of each should be ordered because the two varieties pollinate each other. She said they will be delivered about the middle of February and suggested early sign-up because quantities are limited.

The SCS office has also learned that the Texas Forest Service will sell Afganistan pines for \$30 for a lot of 30, with a minimum order of one lot required. Delivery is planned for March 6. Those trees will arrive potted.

Neepser said the landowner should plant the trees or shrubs as soon as they arrive and be attentive to their water needs, especially during the first three years. She said those who order a quantity of pecan trees should consider some sort of irrigation system.

Industry applauds rules

WASHINGTON (AP) — The Reagan administration is drawing restrained applause from the nation's textile industry for new rules that strictly limit fabric imports if they reach levels that threaten U.S. jobs.

Officials who briefed reporters on the action Friday at the White House denied that the regulations are designed to block textile imports from China, but that nation has been the target of recent industry complaints.

In response to those complaints, the People's Republic has threatened to stop buying American grain and soybeans if the United States chokes off its textile exports.

The officials said it is too early to tell what effect, if any, the new rules will have on garment prices, while representatives of the U.S. textile industry greeted the news with cautious optimism.

"As with all programs of this nature, its effectiveness will depend on how it is implemented. The program the president has announced could produce concrete actions which would help achieve his commitment of relating growth of imports to growth of the domestic market," said Jim Morrissey a spokesman for the American Textile Manufacturers.

Faith is what lets you believe that the refrigerator light truly does go out when you close the door.

Obituary

HERBERT GRASMICK

Funeral services for Herbert Grasmick, 51, of 115 Juniper, have been scheduled at 10 a.m. Monday in Immanuel Lutheran Church with Matthew Sullivan, pastor, officiating. Burial will be conducted in West Park Cemetery under the direction of Rix Funeral Directors of Hereford.

Mr. Grasmick was dead on arrival at Deaf Smith General Hospital at 8:37 a.m. Friday after suffering an apparent heart attack at his

home. He was retired from Holly Sugar Inc.

The Colorado native and 18-year resident of Hereford was a Navy veteran of World War II.

He married Dorothy Manweiler in 1944. While in Hereford, he coached children's baseball teams.

He was a Lutheran. Survivors include his wife; a daughter, Carole Collier of Hereford; a son, Gary of Austin, Colo.; a brother, J. Henry of Colorado; and five grandchildren.

Crimestoppers, Inc.

Deaf Smith County

Crime-Of-The-Week

Sometime Thursday, December 1, 1983 or Friday, December 2, 1983, person(s) burglarized the Art Collectables Gallery located at 609 East Park Avenue. Taken in the burglary was a green suitcase with the contents being Indian Jewelry. One of the items was an Indian Cacho belt, leather, with silver buckles and turquoise stones. The suitcase and jewelry are valued at \$20,150.00. Many other items were taken in the burglary.

Anyone giving information leading to the arrest and indictment of the person responsible for the Crime-of-the-Week will receive a \$500 reward. Anyone having information may contact the Crime Stoppers Clue Line at 364-2583 (364-CLUE).

Any information regarding a felony may be given to the Clue Line. Anyone giving information leading to the arrest and indictment in a felony case may be eligible for a reward. The caller may remain anonymous.

Brand

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Mexican race track caters to good ol' dollars

NUEVO LAREDO, Mexico (AP) — When a \$20 million race track opened in the bustling border city of Nuevo Laredo, the locals thought it could be a surefire moneymaker.

The line was that gambling-loving Texans, unable to legally scratch that itch in their own state, would cross the International Bridges in droves to bet on the dogs and ponies.

But it hasn't quite worked out that way — yet, track officials concede.

The glistening track, located about seven miles south of dusty Nuevo Laredo, usually draws only enough patrons to fill a third of its 10,000-seat capacity, said David Keiter, assistant director of racing.

"Despite the damage done by the peso devaluations, we're making just enough to cover expenses," he said. "Eighty percent of all new businesses fail in the first year, but I don't think that's the case here."

Nuevo Laredo sprawls just across the border from Laredo and the sister cities long have fallen into a comfortable interdependence.

That's why three successive peso devaluations and Laredo's soaring unemployment rate — one of the highest in the nation — have gouged the heart out of both cities' economies.

The race track, everyone thought, would attract tourists. And those tourists would spread their money

throughout both Laredos. Everybody would win, give or take a few \$2 dollar bets.

Tourists did flock to the track when it first opened in mid-March, but the numbers soon tapered off, hotel officials said.

"Everybody thought it would help business. They said the race track would change everything. But it didn't," said Gerald Rodriguez, assistant manager of La Posada hotel, which sits on the banks of the Rio Grande. "There won't be any Christmas in Laredo this year."

"All the properties were hoping it would bring in a lot of business, but that hasn't been what happened," said a front desk clerk at the Laredo Hilton, who would not give her name.

The track consciously caters to Americans, with races announced in English and all payoffs in U.S. dollars.

"We have that border flavor," Keiter said. "A lot of people come down to the border for the weekend, but the race track seems to be the main draw."

The thoroughbreds and quarterhorses run only on Saturdays and Sundays, but the greyhounds race under the stars Thursdays through Sundays.

The track is closed only for a three-week period from late December to January and the usual balmy south-of-the-border temperatures seem to be another attraction, Keiter

said. An advertising blitz currently in the works should help draw more racing aficionados — Texan or otherwise — to Nuevo Laredo Downs, many of whom may never have heard about the track, Keiter said.

"It's amazing to me how we've kept the doors open on a local basis, but we have," he said. "Plans now are to promote it all over Texas."

The ad campaign will be diverse: radio and television spots, magazine promos and billboards, Keiter said.

"However," he said, "we know that the best advertising in the world is word-of-mouth."

It might be hard for some tourists to repeat the Mexican translation of the track's name: El Hipodromo y Galgadero de Nuevo Laredo.

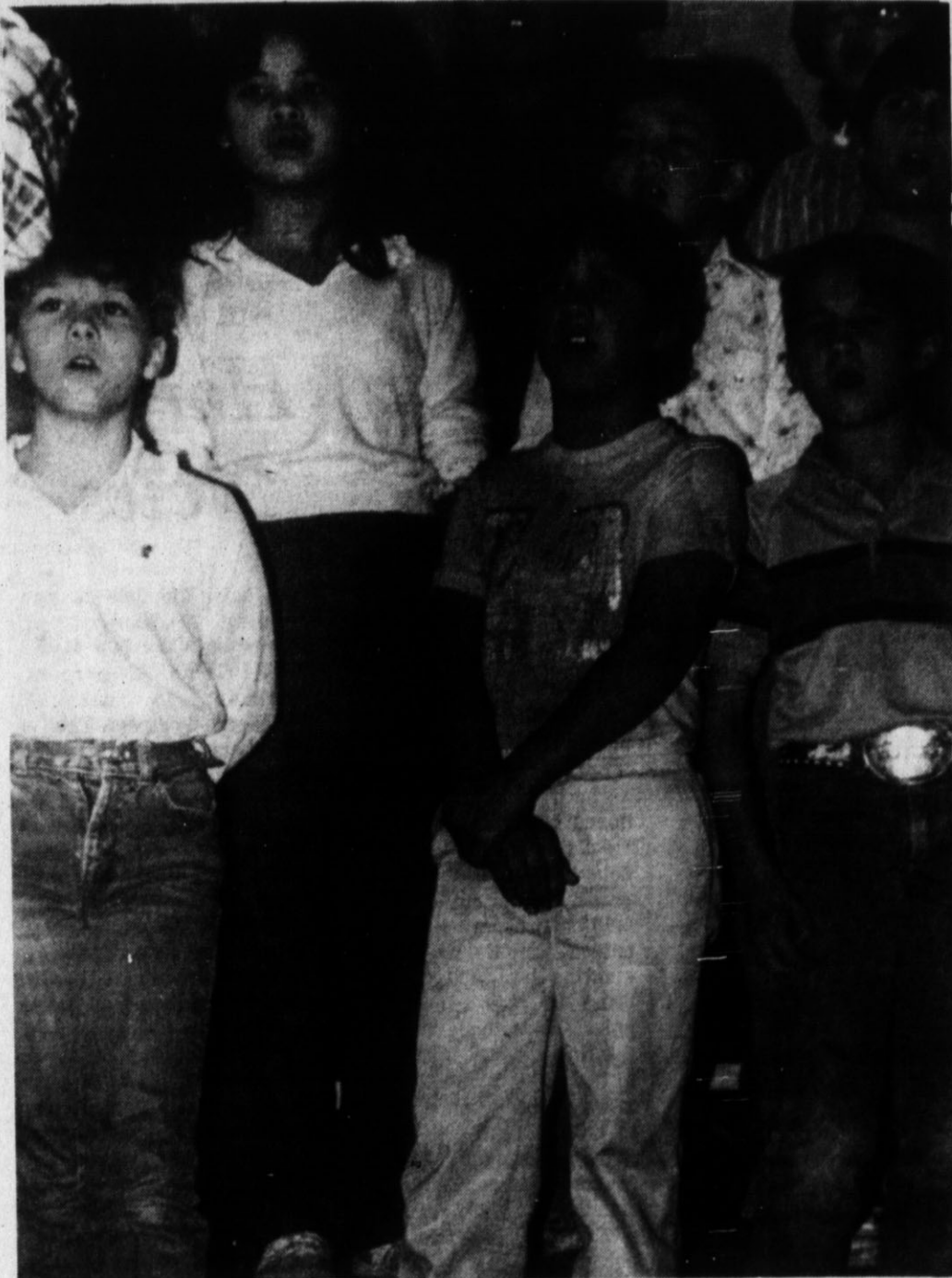
Keiter pointed out that

Nuevo Laredo Downs already has weathered one major crisis — a Mexican labor strike that halted construction repeatedly and swelled the track's price tag from \$8 million to \$20 million.

"Think about it," said Conrad Cruz, head of the Laredo Chamber of Commerce. "They've been in operation

for only a few months, not even a year. The timing of the opening had to be delayed because of the strikes and they needed to train their people. We're still optimistic.

"Besides, we still see the track as an added attraction — not the one savior to our economy," Cruz said.



Sixth Grade Singers

Under the direction of Jane Gulley, these sixth graders helped present an hour-long Christmas

show Thursday afternoon at Shirley Elementary School.

To 'Westernize' town

Bank starts loan program

BANDERA, Texas (AP) — The tourist trade is lagging in Bandera, the so-called "Cowboy Capital of the World," so a local bank has harkened back to simpler times with a low-interest loan program aimed at "Westernizing" the rustic town.

The First National Bank of Bandera has offered to make five-year loans of up to \$10,000 — at an antiquated interest rate of 5 percent — to businesses that use the money to "Westernize" their building facades.

"We'd especially like to do more with the downtown area," said Ken Finley, an assistant vice president at the bank. "We're trying to make it more appealing for the tourists."

Folks here want to entice visitors to mosey on over to Bandera from the dude ranches that dot the sparsely populated Hill Country landscape.

Tourists, you see, spend money.

"Most business-minded people are aware that this could be good for the entire county," Finley said. "You're spending money to get money. It's kind of like an ad: 'Come walk the Western streets of Bandera.' And implied is 'And spend your money with us.'"

Finley is a banker, of course, with a banker's inherent practicality, so good intentions won't guarantee a business the loan at the rock-bottom interest rate.

Applicants must meet the same qualifications as they would for any loan, and a select committee must approve the "Western" remodeling plans.

Response to the loan program, which Finley said he lifted from Granbury, Texas, has been somewhat slow.

"I wish there had been a greater demand, but I'm not surprised," he said. "Once it catches on, it will start snowballing. It's not an original idea, but it's one I thought would be good for Bandera — especially with it being dubbed 'The Cowboy Capital of the World.'"

Jack Frazier, president of the Bandera Chamber of Commerce, says he thinks the program is a great idea to help lift the town of 1,000 out of the tourist doldrums.

"A lot of people come looking for a frontier village and here's half of it modern and some of it just plain rundown," Frazier said. "The tourists come into town

and hit the shops. We want to keep them here to spend their money."

Bungy Grant, the owner of the Bandera General Store, said the town's council decided to help by voting to install hitching posts on Main Street.

"We want all the people at the dude ranches to just ride into town and hitch up their horses," Ms. Grant said. "This is to blend in with the bank's idea. The council just thought this was something they could do."

Finley said most of the "pioneer" remodeling plans probably would employ such rugged-looking materials as cypress, cedar and limestone.

"The wood-front buildings that started Bandera have disappeared over the last 100 years," the banker said. "We're hoping the 5 percent (interest) rate will be the carrot that gets this town looking more like a frontier town."

In a community where

everybody knows everybody, pulling together is almost a way of life, Finley said.

"We've all got a common goal," he said. "We want this community to succeed."



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Guest Editorial

Farm Problem

The Farm Problem continues to be a problem, and while a lot of experts are professing to be worried about it, things do not seem to be getting a whole lot better.

Maybe our farm policy, government farm policy, needs an overhaul. Things on the farm have changed quite a bit since the first Agricultural Adjustment Act was passed in 1933.

The recent Dairy Bill was a case in point. Congress finally passed a law which will pay dairy farmers for not producing milk. This is going to cost American taxpayers a lot of money and it will also cost beef producers, poultry producers and others a tidy sum.

When this bill came up, arrayed on one side were the dairy coops and the agriculture committees of House and Senate. Opposing them were the Farm Bureau, cattlemen, pork and broiler producers, consumer groups, businesses such as Pizza Hut and the Milk Producers Council. These groups lost the battle.

As a result the dairy bill adds to the cost of government price supports on farm products and subsidies which will be \$21.8 billion in 1983 compared to \$11.6 billion in 1982. A lot of taxpayers are upset about this increase in government spending and there is naturally something upsetting about paying people not to produce.

Since the first AAA bill in 1933, farmers have had their ups and downs. The basic problem has not changed all that much, however, and that is the problem of producing more food and fiber than the nation can consume. This shouldn't seem like a problem in a world where hunger is common, but it is a problem when those producing the food can't sell it for enough to pay costs of production.

Farmers have gone deeper in debt in recent years and many farmers are living with a very real fear of bankruptcy. In order to preserve America's farms, Congress is sympathetic toward proposals to help them and this becomes a farm program.

As a result, government subsidies have increased fivefold in the last five years and in 1983 farmers will get nearly as much from the federal government as they get from their crops.

American farmers are being encouraged not to grow new crops, to sit idly by until surpluses are depleted and the market becomes more favorable. Thus American farmers have become so efficient at producing food that they cannot afford to feed the world.

The American Farm Bureau believes that a free market is the best way to control farm products and insure fair prices. Other groups are equally as certain that more price supports, focusing on issues of parity, may be best.

The truth of the matter is that nobody knows what kind of farm policy or farm program is best. All we know is that things are not working out under the present ones.

- The Perryton Herald

As The Years Turn

75 YEARS AGO

The average maximum temperature for the month of November was 60.5 degrees; the average minimum, 26.7 degrees; general average, 43.6 degrees. The rainfall in two snows amounted to less than one inch. The coldest was the night of the 13th, when the mercury fell to 8 degrees above zero.

The officers of both the two national banks and the state bank are pleased with the outlook in Hereford. The combined deposits of the three banks are over the half million mark, there being \$561,916 now subject to check.

Texas farmers are raising more hogs for market, though not as many by half as they should. Most of the increase is in the Panhandle. The Plains make an ideal hog country. Disease is rare, land is cheap and forage crops with kaffir corn and milo maize make raising of hogs easy and profitable.

50 YEARS AGO

More than 20 cattle raisers of this county have registered at the county agricultural office with cutter cows to sell to government buyers in the beef reduction program. Dewey Reed, agent, has told sellers to be ready to deliver cows to Amarillo where government buyers will pass on them.

Hereford's threatened scarlet fever epidemic is under control says Dr. T.L. Morgan, city health officer. Strict quarantine regulations put in effect last week have stopped the spread to such an extent that the situation is no longer serious," Dr. Morgan said.

No new cases have been reported since Sunday. Twenty-six cases are still under quarantine and will remain so until all danger of spread of the infection is past.

25 YEARS AGO

The 28-year-old water rate scale in Hereford was increased at a meeting of the City Commission in the City Manager's office Monday evening. New rates will go into effect in the billing of Feb. 1, and are expected to provide the city with \$20,000 in additional yearly revenue.

A relatively large number of Deaf Smith County farmers voted to continue marketing control on cotton on the 1959 Cotton Referendum held Monday. By a 78 "for" and 24 "against" tabulation, local cotton growers showed more interest in the referendum this year, possibly because farmers are offered the choice of two programs next year - a larger acreage at lower price supports or a smaller allotment at higher supports.

10 YEARS AGO

The 1974 budget was approved, new committee leaders were appointed, and a recommendation made to business firms on DST hours when directors of the Deaf Smith Chamber of Commerce held their final session of 1973 here Thursday morning. The new budget proposes expenditures of \$47,871-an increase of about \$4,600 over this past year.

Hereford's School Board of Trustees Thursday morning approved a bid of \$763,789 from Wiley Hicks Jr., Contractors of Amarillo for the construction of the new elementary building. The Board had just trimmed some \$15,000 from the original bid by Hicks before accepting the figure.

1 YEAR AGO

By better than a 2-1 margin, Texas congressmen opposed the successful attempt Tuesday night to delete some \$988 million for production of MX missiles from a defense appropriations bill.

A hearty menu of scrambled eggs, biscuits, ham, cream gravy, milk, orange juice, and coffee will greet early-rising pheasant hunters when the Hereford Volunteer Fire Department its Ladies' Auxiliary hold their annual Pheasant Hunters' Breakfast Saturday morning at the high school cafeteria.



Doug Manning

The Penultimate Word

HOOKS

I was in a motel in Edmond, Oklahoma. I swear they built the walls in the place out of Saran Wrap. The slightest noise three rooms away would rattle the bedpost in my room.

Late one night a couple checked into the next room. They had been drinking and were pretty well lubricated when they staggered in and proceeded to have a pretty good fight. Sleep was out of the question for me. I sat on the side of the bed and began to referee the affair. I have been counseling long enough to know how these arguments progress. I began to call the next move.

After a few rounds of sparring I began to watch for the hook. A hook is when someone brings up an issue they know the other party cannot help but bite. Biting is when the party in question reacts and becomes defensive. A good hook is an absolute necessity if the fight is to be won. A hook turns the argument away from the issue at hand to an issue long fought over and never resolved.

In the fight that night the lady was winning. She had the old boy going and was headed for the kill. He said, "It was not me who wanted

the abortion." Now, the fight had nothing to do with abortions. The lady dropped her advantage and took off after the hook. She was hooked and the fight was lost.

I should know about hooks. I chased the same one for a great deal of my life. When we were young we went to Monroe, Louisiana to visit some friends. They had sons about the same age as my older brother and me. The older son in the family teased the younger son about his being in love with a girl named Sophie. I never did see Sophie. My older brother picked up the taunt and began to tease me about loving Sophie. I can't begin to number the whippings I received because Tom would say, "Doug loves Sophie," and the fight would be on.

The other day my brother and I were having our running argument about the colander. This argument has been well documented in this column. As my arguments began to wear down his defenses, as would be expected since my arguments are far superior, he said, "Doug loves Sophie," and I hit him.

Warm Fuzzies,
Doug Manning

Letter To The Editor

Dear Editor,

As the holiday season is upon us, we all seem to be so busy with the hustle and bustle of all of the festivities that go along with it, but how many of us have taken the time to stop and look at the newcomers of our neighborhood and ask that family about themselves or their plans?

Have we welcomed them with open hearts, or have we just been too busy to care if their season too is filled with love and joy?

I ask those questions because last year this time my children and I were the victims of an uncaring new town and neighborhood. Our financial status was unbelievable and we weren't able to be with our family. We faced a Christmas of loneliness, and we survived, mainly because we shared our hopes, dreams and most of all our love.

While we were experiencing our low time I wrote a poem to try to express how I felt. It is my hope that as each person reads my words they will stop and think how they would feel if situations were reversed.

Thank you and Have a very special Holiday Season
Vicki Chavis Inman



Almost half the newspapers in the world are published in the U.S. and Canada.

Our Lift

As Christmas day comes so near
I look back to years of past
I remember all of the cheer
Of the Christmas' of my past

Now as I begin to prepare
for my children's day of joy,
I suddenly become aware
Will Santa know my girl
and boy.

It's hard for a mother to explain
to her son, so full of cheer.

That the toy of his dreams,
that little train,
Will have to wait, until next year.

And my little girl, her eyes so blue
Without even a coat to keep
her warm
Wants so much to have

something new
Something that she knows
has never been worn.

We may not have any pretty gifts
or family to spend, our
Christmas with
But with our love and Gods
love, our gift

Will make this Christmas
one
We'll never forget.
Vicki C. Inman

Free market flies high

U.S. Chamber Voice of Business

By Richard L. Lesh, President

WASHINGTON - The advocates of a national industrial policy-read centralized planning-believe that more government control of the economy would be a good thing. Bureaucrats, they argue, could plan out the economy and do a better job than consumers and businesses working together through the free market.

This, of course, is a silly idea, but Washington is a breeding ground for silly notions, and when silliness threatens to become enshrined in law, it is a matter of serious concern to the American taxpayer.

The politicians, bureaucrats and left-wing intellectuals who let the phrase "industrial policy" loiter at the end of their tongues the way a baby plays with its first word would do well to remember Alfred Kahn's reasoning behind the airline deregulation bill of 1978: "One reason I thought we ought to get out of the regulation business

was because you can't predict anything from Washington."

Mr. Kahn did not say that bureaucrats could not predict everything from Washington. He said they could not predict anything.

Alfred Kahn ought to know as he was the Chairman of the Civil Aeronautics Board, the agency that used to regulate the airline industry until Mr. Kahn led the drive to deregulate that industry and put himself out of a job.

Kahn was joined in that effort by President Carter, Sen. Edward Kennedy and Ralph Nader as well as conservative Republicans. Thus, only five years ago, congressmen and public interest groups spanning the political spectrum from left to right joined together in an overwhelming rejection of an industrial policy for the airline industry. That same coalition then began the drive to deregulate the trucking industry, bus lines and railroads.

As the debate on industrial

policy continues it may pay to compare the five-year history of airline deregulation with the previous 40 years of government control of airline prices and route schedules.

Let us, as Hubert Humphrey used to say, look at the record.

Bureaucrats argue that regulation keeps prices down, but under deregulation airline tickets have dropped from what they would have been under government-set pricing schedules by more than \$10 billion during the five years since 1978. In 1978 dollars, the cost of a flight from New York to Los Angeles has dropped from \$312 to \$195, and this Christmas a college student in Boston can visit his grandmother in Florida for \$49.

Such discount pricing was illegal under regulation.

Score one for the free market: lower prices for consumers.

Critics feared that deregulated airlines would end service to smaller communities. While very small

airports have lost an average of nine percent of flights, no community has lost all service since 1978 and the explosion of new and expanded commuter airlines has actually increased service to many cities and towns.

Score two for the free market: more and better service.

Government bureaucracies often pose as the only bulwark against monopolies and the concentration of economic clout. Under deregulation, however, the number of interstate airlines jumped from 36 to 96, and the market share of the large airlines dropped from 91 percent to 79 percent. (Contrast this with the 40-year history of regulation when no new interstate airlines were allowed.)

Another win for the free market: more innovations, more airlines and more competition.

Union leaders in the airline industry clamor for a return to the "good old days" of regulation, claiming that

poll says Mondale is now leading among all Democrats: Mondale 48 percent, Glenn 20 percent, Jackson 10 percent, McGovern 6 percent. Each of the others less than 2 percent.

That opinion poll commanded multi-media attention. Those findings were based on only 412 telephone calls?

During the coming months we will be advised - and conceivably influenced - by a drumbeat of such surveys. We need to evaluate them before we put too much confidence in them.

Frequently during speaking engagements I have asked if any member of the audience has ever been questioned by a political pollster. In audiences of thousands most frequently none has.

While Gallup and Nielsen and a select few conscientiously seek a cross-section reflection of opinion - most of the "samplings" should be taken with a grain of salt.

Pundits who project election results and end up embarrassed by their predictions frequently forget that a very large percentage of Americans, asked, "How are you going to vote?" ... hand up!

(c) 1983, Los Angeles Times Syndicate

Bootleg Philosopher

Federal Deficit

Editor's Note: The Bootleg Philosopher on his Deaf Smith grass farm brings up an unpleasant subject this week, but not for long.

Dear editor:
According to an article I read last night, Washington not only doesn't know how to reduce the deficit, it doesn't even know how much it is.

The announced figure is about \$200 billion, but, financial experts say, when you add in the hidden items that are called un-budgeted, the figure comes to over \$400 billion.

The Republicans blame the deficit on the Democrats on Monday and Tuesday and the Democrats blame it on the Republicans on Wednesday and Thursday, and they're both right as there seems to be enough blame to go around with enough left over for a third party if there was one to fill out the rest of the week.

In denouncing government spending so long as it doesn't cut off any funds going to his

state, a senator the other day said we're building up huge burdensome debts to leave to our grandchildren, but, it has been suggested, what makes you think our computer-skilled grandchildren won't be smart enough to leave the debts to their grandchildren?

The main Washington attack on the deficit has been, "Let's don't talk about it now. We got an election year coming up."

Or, as the saying goes, "Speak not of rope in the house of him who has been hanged."

I got to thinking about this country's debt, then widened the field to take in the rest of the world. I don't suppose anybody knows, or wants to know, how much the whole world now owes more than it's worth? And if so, who'd foreclose?

This is something that needs thinking about, but not now. Some other time.

Yours faithfully,
J.A.

Bloomin' good year for poinsettia plants

SAN ANTONIO, Texas (AP) — For millions of Americans, poinsettias have become a symbol of Christmas.

To the consumer, the showy plants' brilliant red and contrasting green colors serve as a popular decoration during the holiday season.

To retailers, the plants act primarily as ornamental decoys for attracting customers to stop and shop for other items at their stores.

But to members of the floral industry, the delicate poinsettias represent the most profitable time of the year.

Some 250,000 to 300,000 poinsettias are expected to be sold in the San Antonio area this year — a small portion of the more than 30 million potted plants that will be purchased nationwide, floral industry experts say.

The dollar value of those sales is pure speculation, according to Paul Ecke Poinsettias Inc. of Encinitas, Calif., the largest producer of poinsettias in the world.

But some industry spokesmen have conservatively pegged the retail value at more than \$150 million.

A better quality poinsettia as well as improved economic times have caused the demand for the holiday plant to be stronger this year than in 1982, local growers say.

Most report a sellout of the crop, with most of the sales occurring between mid-September and early November.

Most of the flowers go to floral retail outlets, although the big grocery stores and hardware chains are important customers in the city, too.

"It's the biggest holiday plant we have," said Jerry Dietert, co-owner of Dietert Greenhouses.

Poinsettias outsell plants associated with other big holidays such as Valentine's Day, Mother's Day and Easter, he said.

"Demand is at least as strong this year as last. And people are buying poinsettias earlier this year," said Bob Webster, co-owner of Shades of Green nursery and gardening columnist for the San Antonio Express-News.

The poinsettia crop is nice this year, Webster said, because the weather in 1983 provided enough sunny, bright days for the crop's good health.

But growers agree that the improved breeding of poinsettia varieties over the past 10 years has contributed to the plants' popularity.

Poinsettias have improved; now the decorative plants sport more and larger blooms, Webster said.

Furthermore, the plants' longevity has increased, now making it possible for poinsettias to be enjoyed in the home or office for up to several months, florists note.

The origin of poinsettias, a member of the phorbia pulcherrima family, can be traced to Mexico and Central American countries.

The vividly colored plant is named after Joel R. Poinsett, the U.S. ambassador to Mexico who introduced poinsettias to America in the mid-19th century, said Dr. Leon Tolle, a marketing and management professor at

Our Lady of the Lake University of San Antonio.

Tolle, who at one time planned to be a florist, has bachelor's and master's degrees in floriculture from Texas A&M and a doctorate in horticulture from Michigan State University.

The commercialization of poinsettias started in the United States in the early 1930s, but the floral industry didn't become serious about producing them until the early 1950s, Tolle said.

Today, the poinsettia has become a traditional Christmas plant and even a religious symbol, not only in the United States but Canada and Western Europe as well.

Consumers of poinsettias also buy them for their convenience — they make easy gifts — as well as for color, he said.

The poinsettia business is virtually a separate part of the potted plant industry, Tolle said, adding that the poinsettia industry is highly integrated and specialized.

Some people specialize in breeding the plant and selling green cuttings from those plants — poinsettias are not grown from seeds — to growers. They, in turn, pot the rooted cuttings and grow poinsettias in a carefully controlled environment.

Most of the U.S. specialists who develop poinsettia varieties — known as propagators — are in California and Florida.

Growers — there are only about three large ones and a few smaller ones in San Antonio — must pay royalties for plants they sell that have originated from patented poinsettia cuttings.

Despite the difficulty and high cost of growing poinsettias, they are still a highly profitable product, local growers say.

One common misconception about poinsettias is that they are poisonous. The industry has gone to great lengths to prove that they are not harmful.

Lois R. Frizzel, executive director of the Texas State Florists' Association, said research conducted by Ohio State University and the Society of American Florists-The Center for Commercial Floriculture revealed the plants to be non-toxic.

The Texas association's president of three years ago went a step further.

He proved the plant's innocence by eating on television, without consequence, a poinsettia sandwich.

The World Almanac



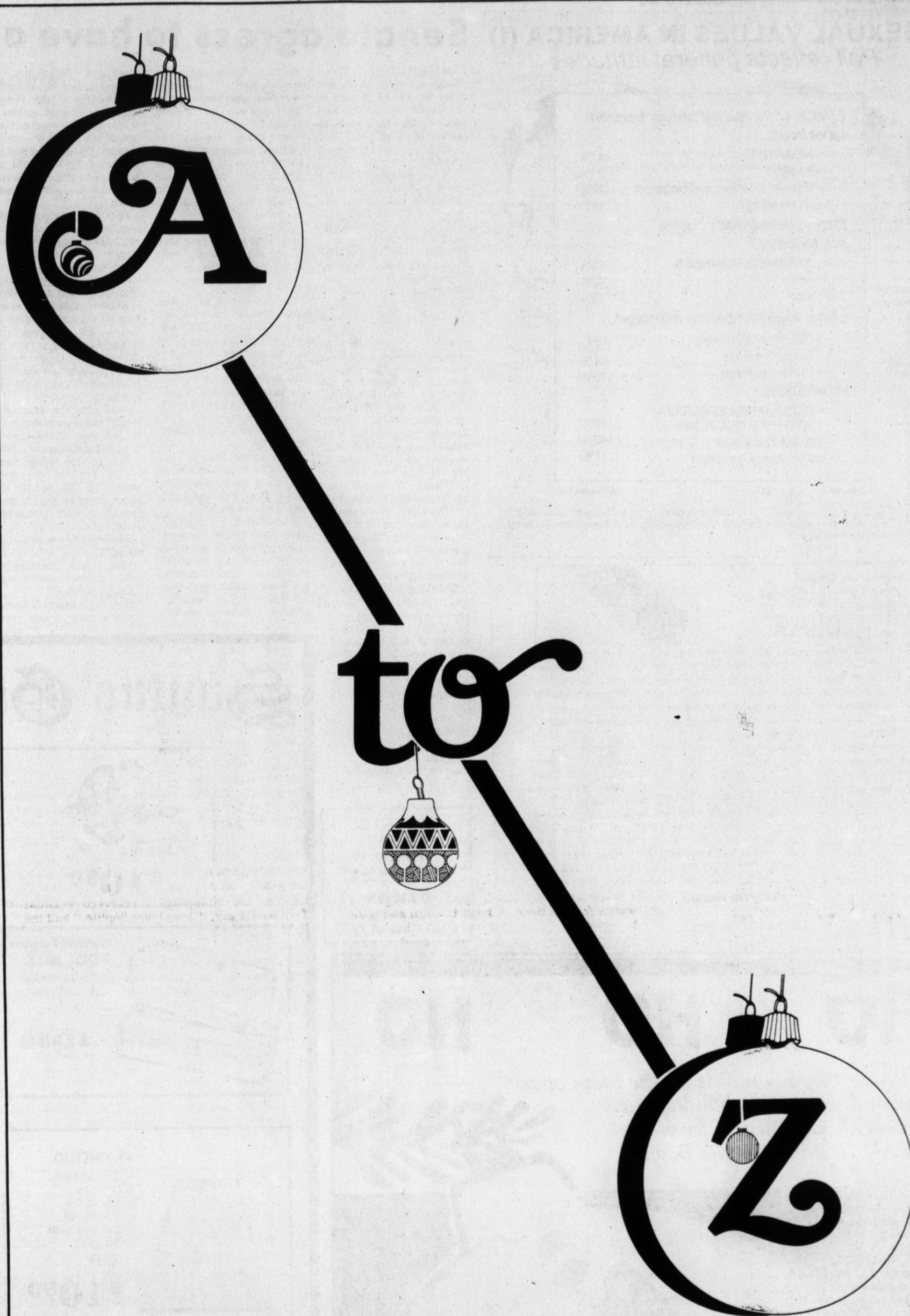
1. Who was John McEnroe's partner in this year's men's doubles competition of the USTA National Championship? (a) Steve Denton (b) Peter Fleming (c) Kevin Durren
2. What is Utah's state bird? (a) seagull (b) mockingbird (c) crow

ANSWERS

1. b 2. a 3. b

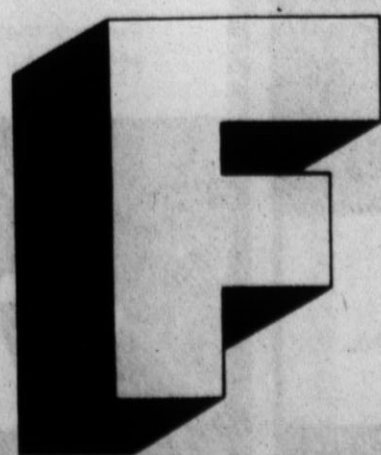
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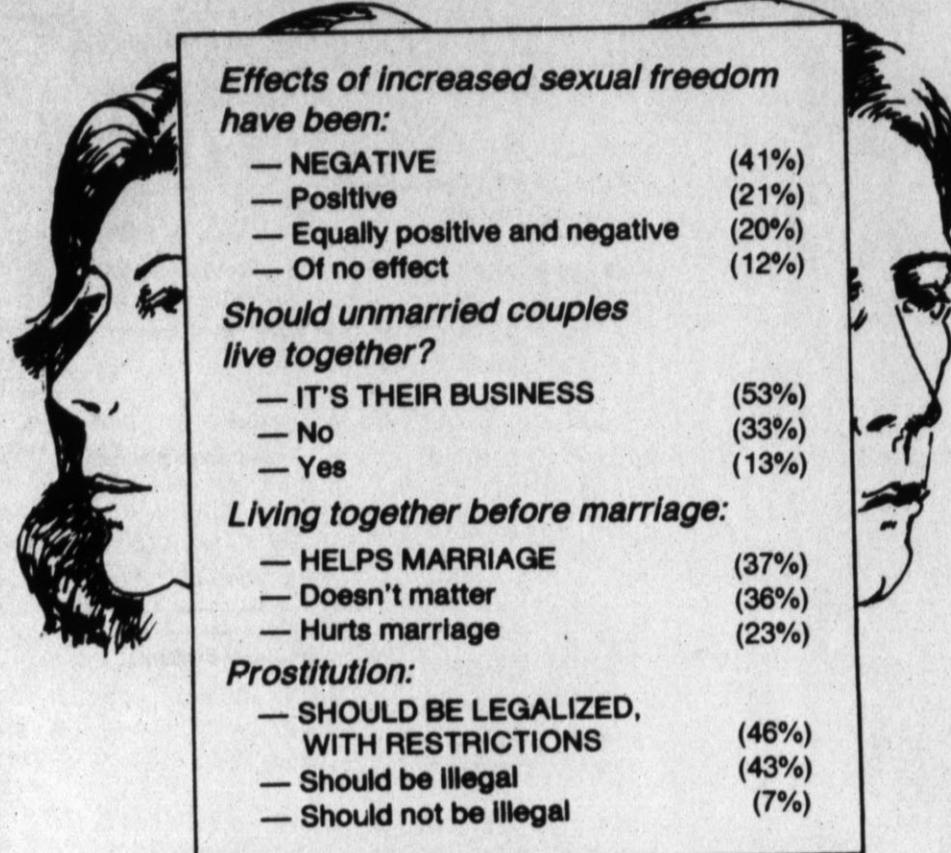
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Christmas Program 7:30 p.m.
"Christmas Is The Man From Galilee"
Sunday Services: 9:45 a.m. Sunday School
Worship Service 11 a.m.
Wednesday Night 7 p.m.
Sunday Evening Service 6 p.m.

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SEXUAL VALUES IN AMERICA (I) **Senate agrees to have a day care center**

Poll reflects general attitudes



Effects of increased sexual freedom have been:

- NEGATIVE (41%)
- Positive (21%)
- Equally positive and negative (20%)
- Of no effect (12%)

Should unmarried couples live together?

- IT'S THEIR BUSINESS (53%)
- No (33%)
- Yes (13%)

Living together before marriage:

- HELPS MARRIAGE (37%)
- Doesn't matter (36%)
- Hurts marriage (23%)

Prostitution:

- SHOULD BE LEGALIZED, WITH RESTRICTIONS (46%)
- Should be illegal (43%)
- Should not be illegal (7%)

(Source: The Merit Repo.) NEA/Moffitt Cecil

Many Americans are critical of the overall effects of the "sexual revolution," according to a recent poll of 1,200 adults. Yet they hold a more liberal view on living together without marriage.

WASHINGTON (AP) — Toddlers, teddy bears and tricycles will be converging on Capitol Hill in the New Year because the Senate has agreed to set up a day care center for its employees' children.

"I tell everybody it's the most important piece of legislation they passed this year," says Susan DeConcini, wife of the Democratic senator from Arizona, and a spirited advocate for the center. "It should be an encouragement to others — particularly private industry."

Mrs. DeConcini, her husband Dennis, and Sen. Paula Hawkins, R-Fla., were the unofficial triumvirate that organized a minor legislative coup and pushed the measure through the Senate in the final days of the 1983 session.

To do so, they drew on an extraordinarily diverse brigade of supporters that included male and female staff workers and the wives of several prominent senators — Nancy Thurmond, Lori Riegler, and Marcelle Leahy.

"This is not just a women's issue," DeConcini said in an interview. "Providing quality day care is necessary to help bolster the industrial sector of our economy."

DeConcini and his wife, a social worker who has a special interest in day care, have visited children's centers around the country and overseas, including centers in Egypt and Israel.

"I'm interested in her career and she's interested in mine," said DeConcini.

"Mrs. DeConcini was the spirit behind it all — and you should have seen how Paula Hawkins lobbied those senators," said Marge Baker, minority counsel for the

Judiciary subcommittee on juvenile justice. "She stood at the door and lobbied them like crazy when they came in to vote."

Ms. Baker, who has two children, thought up the idea for the center and sent out 750 questionnaires about a year ago to see whether it was needed. She got about 140 responses.

"We work crazy hours up here," she said. "There were plenty of parents, and even single parents, that needed help."

DeConcini had to gather colleagues for a crucial vote in the Rules Committee and then ferried the measure to the Senate floor. During the debate, he told his colleagues that more day care centers are needed because 46 percent of children under 6 years live with parents who both work, or with a single parent who works.

"The Senate must look to the needs of its employees, like any other employer," he said. "This will help build family relationships."

Supporters had to plead for space and \$20,000 in seed money. It was envisioned the center would care for about 40 children — ages 18 months to 5 years — and be located in old Senate offices vacated after senators moved into the

new Hart Office Building.

Plans called for allowing the children of any Senate employee — from cafeteria workers to committee lawyers to senators — to be eligible. The center would be supported by fees paid by parents on a sliding scale and the children would be chosen by lottery.

Convincing the Senate was a task even a veteran Capitol Hill lobbyist might find daunting.

Not only did they have to win over a budget-conscious chamber — many of whose members voted to slash federal day care funding in 1981 — but members who feared that voting in favor of the center would give voters the impression they were adding to the long list of senatorial "perks."

Sen. Charles Mathias, R-Md., the floor manager of the bill, said "employers are recognizing that quality child care is at least as important to the families of many employees as health insurance, retirement plans, and other more traditional benefits."

Some senators were unconvinced.

Sen. Mack Mattingly, R-Ga., argued the center was "purely frivolous."

Sen. Jim Sasser, D-Tenn., asked whether it was "fair

that the children of Senate employees, including senators, should be afforded the luxury of day care, when, since 1982, 32 states have cut funding for child care? I think not."

But Mrs. Hawkins, pointing out that the center was not a benefit meant for Senate employees but for the youngsters, asked the senators "to think of the children."

A majority did, and the

measure passed 50-31.

"It is a real step forward," said Mrs. DeConcini. "I hear the employees in the House are green with envy."

Neither she nor Ms. Baker will actually use the center, since Ms. Baker is moving away from Washington with her husband and the DeConcinis' children are 19, 21 and 23 years old.

"But that doesn't make any difference," says Mrs. DeConcini.

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Saul became more and more fervent in his preaching, and the Damascus Jews couldn't withstand his proofs that Jesus was indeed the Christ. After a while the Jewish leaders determined to kill him.

But Saul was told about their plans, that they were watching the gates of the city day and night prepared to murder him. So during the night some of his converts let him down in a basket through an opening in the city wall!

Upon arrival in Jerusalem he tried to meet with the believers, but they were all afraid of him. They thought he was faking! Then Barnabas brought him to the apostles and told them how Saul had seen the Lord on the way to Damascus, what the Lord had said to him, and all about his powerful preaching in the name of Jesus.

Then they accepted him, and after that he was constantly with the believers and preached boldly in the name of the Lord. But then some Greekspeaking Jews with whom he had argued plotted to murder him. However, when the other believers heard about his danger, they took him to Caesarea and then sent him to his home in Tarsus.

Meanwhile, the church had peace throughout Judea, Galilee and Samaria, and grew in strength and numbers. The believers learned how to walk in the fear of the Lord and in the comfort of the Holy Spirit.

Acts 9:22-31

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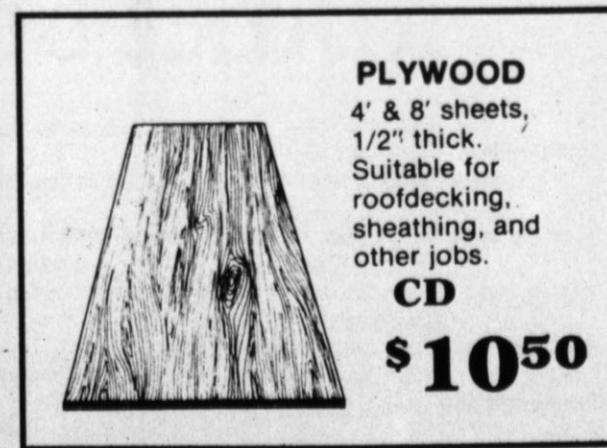
Santas' Gift List



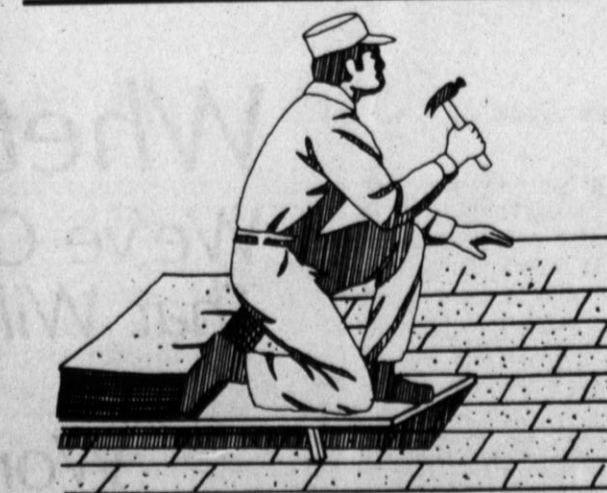

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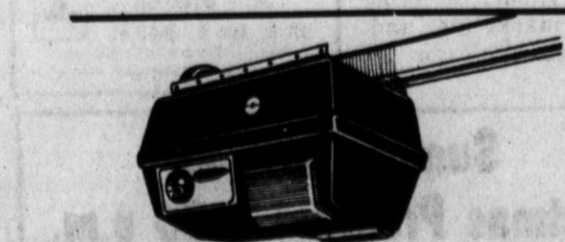
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Congressional hopeful advocates program

BY KIM THOGMARTIN
Staff Writer

Congressional hopeful Delwin Jones said Thursday he would advocate a major, federally-guaranteed loan program that would enable farmers to maintain their pride and still stay in business.

The former state representative announced his candidacy earlier this week in the Democratic primary to run for the 19th District Congressional seat being vacated by Kent Hance.

Citing government help given to Boeing Aircraft and Chrysler Corporation, the 59-year-old Jones said he would like to see federal guarantees on loans made by local banks, perhaps as much as 80 percent.

For people in the 19th District, the common denominator of problems is the national economy, Jones said. "Deficit spending is inflation, and it causes high interest. The budget deficit must be reduced."

"The Department of Agriculture needs to stop concentrating on short-range political rulings and look ahead," Jones stressed. "If agriculture continues to be in a serious state of depression, we will see a continuous economic depression everywhere. It is only a matter of time before agriculture affects everything else."

Jones served four terms in the Texas House of Representatives from 1965 to 1972. As a

Texas House member he was chairman of the Agriculture Committee and also served on the Mental Health and Mental Retardation, Appropriations and Governmental Affairs Committees.

As chairman of the Southern Council of State Governments Agriculture Committee, he helped the board address federal problems and issues directly affecting the 13 members states. This led to a post with the National Council of State Governments.

A farmer and businessman, Jones has investments in several area enterprises. A graduate of Texas Tech University, he has a son and daughter who also graduated from Tech. He is a native of Lubbock County and his wife, Reta, is originally from Olton.

Speaking in Lubbock Wednesday, Jones said name recognition will aid him in his campaign and that those who compete with him in the primary will need three times more money than he plans to spend to run a good campaign.

The other two announced candidates are Don Richards, at Lubbock attorney, and Lubbock physician John Sleyby.

Since his defeat for reelection to the Texas House in 1972, Jones has campaigned unsuccessfully for the Texas Senate and Lubbock County tax assessor-collector.



Hicks Is Honored

R.D. "Don" Hicks, right, was honored this week during the ASCS County Convention for his work the past nine years on the County ASC Committee. Making the presentation was John Fuston, ASCS County Executive director. Hicks has served as vice chair-

man of the committee and was the chairman for 1983. He and his wife, Mildred, reside four miles west of Ford. A former county commissioner, Hicks is active in community affairs, working with Kings Manor and is a past president of the chamber.

Ultimate proof

Americans taking on debt

NEW YORK (AP) — Once again, Americans are confident enough to take on debt, which is probably the ultimate proof that the recession is long gone and almost forgotten in many households.

Not in all households and in all areas, to be sure, because the recovery is not as all-embracing as statistical measurements might indicate. Most measurements are national; they average things out.

But in the aggregate, there is no question that the numbers do equal confidence. Consumer installment debt in September rose \$2.38 billion and then doubled that increase — \$4.89 billion — in October.

What those monthly totals added up to was a total consumer installment debt of \$371.56 billion at the end of October, 10.4 percent higher than a year earlier, when the nation was just beginning to break its recession bonds.

It is a well-known fact that people borrow when they feel their jobs are more secure and their incomes are likely to rise. It is then they dream again of the better life and splurge if necessary to pay for it.

It is the opposite of when

they are down and out. Then they mask their dreams, hide their credit cards and postpone buying. They do not borrow because they fear borrowing — or more accurately, they fear being unable to repay.

In recent months the sense of security has been rising sharply. The jobless rate fell to 8.4 percent and 370,000 people were added to payrolls in November, and in the same month the level of help-wanted ads rose to a two-year high.

And there was the discomfort index to add support. Based on this index, people today are quite comfortable, at least when compared to their condition of a year ago and especially when matched against that wretched year of 1980.

The discomfort index is at its lowest level in a decade, under 12 percent, which borders on the euphoric. At some points in recent years it has been close to 25 percent, an excruciatingly high and barely bearable level.

The discomfort index is made up of the inflation rate and the unemployment rate, and both rates have fallen sharply in the past year or so. In the third quarter of 1982, for example, the consumer

price index was at a 7.7 percent rate, and the civilian jobless rate was 10 percent, for an index of 17.7.

But, lest they begin feeling too comfortable at today's low rate, people might be reminded that missing from the discomfort index is an important ingredient, one that causes considerable distress.

It is the borrowing rate, and on many installment loans it has fallen very little in the past year. You might note, for example, that you may be paying more than 19 percent on your credit cards, nearly the same as a year ago.

When reflected upon, you may agree, rates of that level could be enough to shake your confidence.

Mass held for people's convenience

PITTSBURGH (AP) — At 2:30 a.m. every Sunday, people whose lives border on the other side of midnight — bus drivers, cabbies, newspaper truck drivers, college students, police officers — gather at Epiphany Roman Catholic Church.

It is time for the Printer's Mass.

They come for the convenience of the hour, but they also come out of tradition. The 2:30 a.m. Mass was begun 80 years ago to accommodate Pittsburgh's newspaper printers, who would go to the big brick church after putting out their Sunday editions.

"It's convenient. That's no lie. If I didn't come to church, I'd sleep in," said Keith Duerling, 33, a bus driver who has

served as an altar boy for eight years. "It's quick and it's quiet. There's no one to bother you," said Jeff Studeny, 20, a department store printer.

"It's a tradition and we just keep coming," said Henry Johns, 69, a retired traffic supervisor for a cab company who began attending the Mass 20 years ago.

Pope Leo XIII granted special permission to

schedule the Mass at the request of printers at the old Pittsburgh Sun-Telegraph who wanted to attend church after finishing work at 2 a.m.

"The thing that our Mass answered was for the convenience of the people," said Auxiliary Bishop John B. McDowell, who first attended

the Mass as a seminary student in the early 1950s.



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EYE CARE UPDATE

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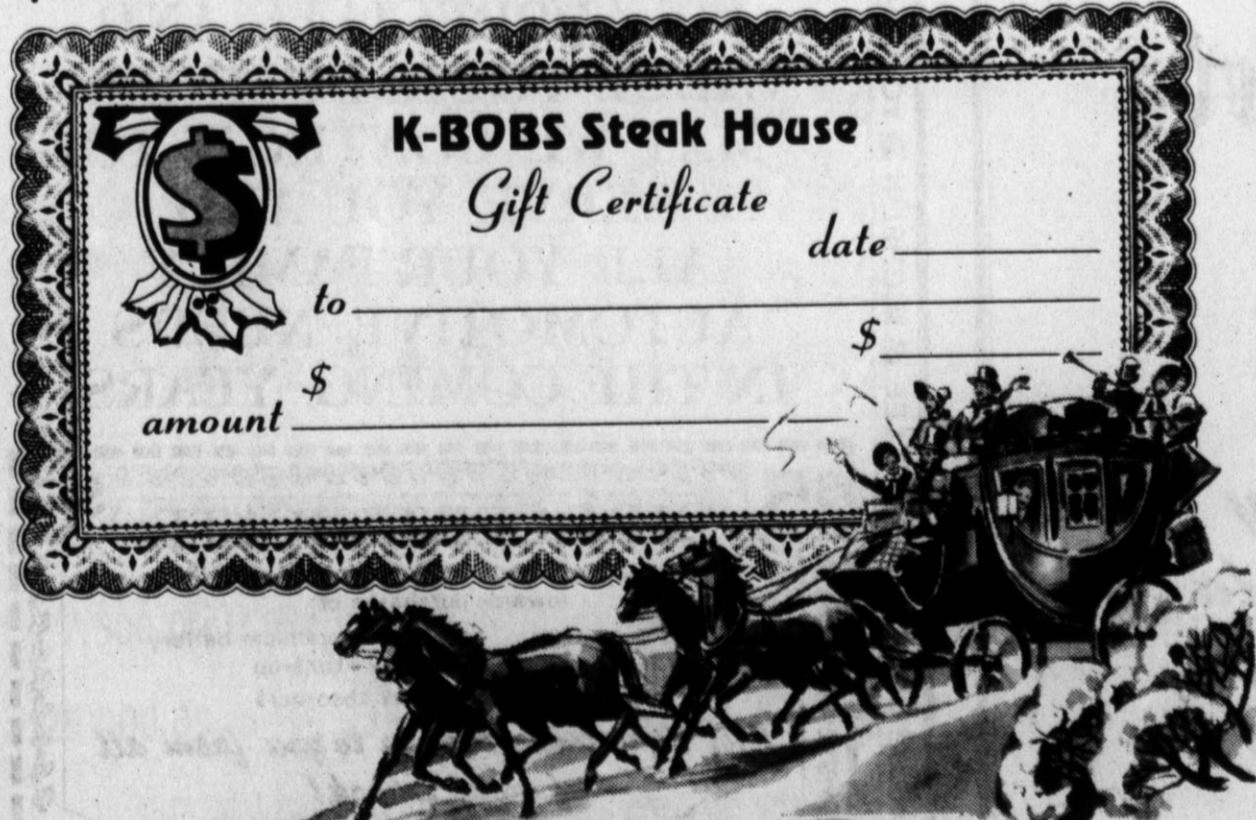
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Sports

Of San Angelo Tourney

HHS fems make finals

Varsity girl basketball players from Hereford High School were to play Wichita Falls-Rider Saturday night for the San Angelo Tournament championship.

Hereford advanced to the final with Friday wins over San Angelo-Lakeview (44-41) and the junior varsity squad from San Angelo-Central (57-37).

Heading into the Rider contest, HHS varsity girls were 5-3 on the season, including a competitive District 3-5A mark of 3-1. The Whitefaces are slated to host tough district foe Amarillo Monday at 6 p.m.

In Friday's first contest,



The universal birthday for any horse born in any given year is January 1.

Natalie Sims provided clutch second-half play to key the win over Lakeview, picked to win the tournament. She ended with 16 points, high for HHS. Cathy Bartels and Stacie High added 12 and 10, respectively.

According to HHS coach Larry Sowers, Lakeview led once in the fourth quarter by a point, but Sims hit two unanswered outside shots to key the win. She was making only her second varsity appearance ever and, for the second time, "played really, really well for us," Sowers said.

After trailing 11-10 going into the second quarter, HHS led 24-17 at halftime and 34-29 following three periods.

Against Central JV, Hereford jumped out to a 20-2 advantage after eight minutes "and coasted the rest of the way," Sowers commented. High had 14 points for the Whitefaces, who also received 12 from Teresa Phibbs, 11 from Bartels and 10 from Sims.

Brockman, Streun are All South Plains picks

Honors continue to come for Hereford Whiteface football players following the team's brief appearance in the Class 5A playoffs this season.

Linebacker Lee Brockman and safety Jeff Streun were named Saturday to the Class 5A All South Plains grid team as selected by the Lubbock Avalanche Journal newspaper.

Streun, a 5-10, 155-pound senior, had already been named to the All-District team and the Panhandle-Plains Super team. Brockman, 6-2, 190, was also an all-district selection and he was the only junior on the South Plains defensive team.

The A-J named Midland Lee's Spike Dykes as coach of the year on the dream team, and Lee's Isaac Garnett, 215-pound senior running back, was picked as "player of the year." Lee also had four offensive linemen on the team.

Plainview running back Randy Williams was the only 3-5A player on the offensive team. District 3-5A had Brockman, Streun, Plainview end Roy Thompson, Amarillo tackle David Scott and Monterey linebacker David Deatherage on the defensive team. Coronado's Chris Moore was picked as the punter, and Palo Duro's Gerry Smith was named as the kick returner.

Odessa Permian had five players on the squad, including quarterback Rex Lamberti who completed more than 60 percent of his passes for more than 1,000 yards.

Yogi Berra to pilot Yankees; Martin stays on as 'adviser'

NEW YORK (AP) — Yogi Berra alternated between an expression of puzzlement and a wide grin that split his oval face like a cracked egg. Billy Martin had just been fired as manager of the New York Yankees, and Yogi was a little out of his element.

Squat and not particularly pretty, he belonged in striped knickers with dirty knees. But there he stood, wearing a suit and necktie, the new manager of the Yankees.

"I love it here," Berra said. "I've been playing baseball since I was 17. What other job could I have?"

On Friday, the Yankees named Berra to replace Martin, who guided the Yankees to a third place finish in 1983 and nearly was fired as far back as last June over a

clubhouse shouting match with a New York Times researcher.

Berra, Yankees owner George Steinbrenner, and Judge Eddie Sapir of New Orleans, Martin's agent, met first with reporters in Steinbrenner's office, then the three held a news conference for the radio and TV crews.

"Nobody can see me," the 5-foot-8 Berra complained while standing behind a dais bristling with microphones. "You got a box?"

One of the TV crewmen brought Berra a metal box, and standing atop it, leaning down into the forest of microphones, the Hall of Famer and former Yankee MVP catcher was reintroduced to New York's media.

While obviously elated at the prospect of managing, the moment also had its embarrassing side for Berra, who has been a Yankee coach since 1976. Sources and published reports had Berra waiting in the wings for two weeks as Steinbrenner picked the right moment to announce the switch. It was uncomfortable situation for Berra, who is not particularly comfortable in a crowd anyway.

But, with Steinbrenner saying "the decision doesn't go back as far as people think," Berra was Yankee manager for the second time, thus ending Martin's third go-round in the job.

Martin, who has been fired as a major league manager six times, will stay on as an adviser to Steinbrenner, who said he would honor the four

years that remain on Martin's \$400,000-per-year contract.

"All I can say is what's best for the Yankees is good enough for me," Martin said from St. Mary's Hospital. "George and I are very close and I want to keep it that way. For now, I have a long-term contract with the Yankees. I have three years as a consultant after the four years as an adviser, all making good money."

Martin did not rule out his managing another team, though.

"Not by far," he said. "But I don't want to cross that bridge right now. My agent's handling all those things."

Former Yankee Manager Gene Michael was named to replace Don Zimmer as third base coach, and Roy White will take over Berra's first-base job. Jeff Torborg will stay on as bullpen-pitching coach.

"People don't look at Yogi as a smart manager," said Michael, who had been in the

Yankees' front office. "But he is a smart manager."

At the meeting with reporters, a question was posed to Berra. He had just become the Yankees' eighth manager since Steinbrenner bought a controlling interest in the team in 1973. How could he expect to get along with his combative boss where so many others had failed?

"I don't get too mad too often," Berra said. "I listen, but that doesn't mean I have to do what they say."

Before getting his turn to speak, Berra first listened to Steinbrenner explain the "personnel moves," then waited patiently while Sapir spoke for Martin, who did not attend the news conference. Martin was in a Minneapolis, Minn., area hospital undergoing hemorrhoid surgery.

Steinbrenner said Martin's firing was in the best interest of the team, adding, "My relationship with Billy Martin has never been better. Our friendship was never stronger."

Writer picks Don January as Pro Athlete of Year

By DENNEH FREEMAN

AP Sports Writer

DALLAS (AP) - My nomination for the 1983 Texas Professional Athlete of the Year, men's division, is 54 years old.

He moves so slow you'd think he was 84.

But he can still play his sport better than most folks three decades his junior.

By now, you've guessed who it is, haven't you?

Yeh, it's "Old Folks," Don January, the man with the timeless, fluid, upright swing who can still pump the tee ball out there with the best of them.

Lost in all the Washington Redskins-Dallas Cowboy fervor, the miracle Dallas Mavericks, and assorted hoopla was the recent conclusion of the Senior PGA Tour at Boca Grove Plantation in Florida.

January finished 10th for his worst-ever tournament on the Senior Tour.

That was news of sorts.

But it was enough for him to hold off fellow Texan, Mr. X, Miller Barber, for the Official Money and Scoring Average titles.

Understand now that there are a few fellows named Billy Casper, Gene Littler, Arnold Palmer, Gay Brewer, Rod Funseth, Doug Sanders, Peter Thomson, Robert de Vicenzo, and Gardner Dickinson involved.

In other words, January didn't win the aforementioned titles against a bunch of 50-year-old mulllets.

January finished the year with \$237,571 in official earnings, just ahead of Sherman's Barber, who sacked \$231,006.

But the most impressive thing was January's stroke average.

He averaged 69.46 for the year to second-place Barber's 70.15.

That's the kind of shotmaking that should earn January an award.

And it has. Two of them. He will receive the Senior

TOUR version of the Arnold Palmer Award (leading money winner) and the Byron Nelson Trophy (scoring average) at the PGA Tour's national awards dinner in Los Angeles, Tuesday, Feb. 14.

He relaxes from the tour tension by playing golf.

Sorry, Randy White and Eric Dickerson and Mark Aguirre and Ralph Sampson.

My vote goes to the golfing giant with the upturned collar and slow motion walk who is just eight years away from Social Security but isn't going to need any.



Your Hair Today

by Keith Hume

I'm often asked, "What's the difference in perms (or bodywaves)? Aren't they all the same except for the price tag?" Well (phrase coined by Pres. Reagan) the cost of wave solution varies. If you have priced these products you know how much. Some are more than ten times as much as others. The proper one is the first important consideration. The cost is negligible for it won't be more than \$15. Your professional may also need to use additional conditioners between steps (also negligible) to keep your hair strong. Training & experience make the difference here. The main thing is the number of rods used and the steps taken. Time. The best wave solution processed with the rods too far apart will not give good results. The perm rods can't be too tight, too far apart, uneven, or over directed & they should be horizontal.

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Dallas, 49ers meet Monday in final NFL regular game

SAN FRANCISCO (AP) — It has been almost two years since the Dallas Cowboys came into Candlestick Park with a score to settle, only to be shot down one step from the Super Bowl.

"They remember us. They remember the Washington Redskins, too," San Francisco 49ers' Coach Bill Walsh said. "I think they'll come back and play their best game."

The Cowboys and 49ers meet Monday night at Candlestick in the final game of the National Football

League's regular season. Dallas already has clinched a spot in the playoffs, for the ninth straight year. The 49ers, 9-6, may need another victory to claim the National Conference West title and a playoff berth.

A 31-10 loss to Washington last Sunday dropped the Cowboys to 12-3 and made them a probable NFC wildcard playoff entry. The Redskins came out of the Texas Stadium showdown with a 13-2 record and went for the NFC East title-clinching victory when they faced the last-

place New York Giants Saturday.

The Cowboys have won 214 regular-season games under Tom Landry, the only head coach in their history. Only two NFL coaches, George Halas and Curly Lambeau, have won more. Landry said after his 118th regular-season loss, the one last week, "We are embarrassed and our pride is hurt."

He added, "Now, our ability to shake off the loss is the primary thing."

The 31-10 setback was the Cowboys' worst since early in the 1981 season, when the 49ers trounced them 45-14 at Candlestick.

"They took it to us. No doubt about it. We didn't give them the respect they deserved," running back Tony Dorsett recalled. He rushed for only 21 yards that day.

Landry's team returned to San Francisco for the NFC title game that season and went ahead 27-21 in the closing minutes, but the 49ers won 28-27 on Dwight Clark's leaping catch of a Joe Montana pass in the end zone.

The nationally televised Monday night season finale brings the teams together for the first time since the 1981 title game.

Pride on line for Oilers, Colts

BALTIMORE (AP) — There's nothing but pride on the line Sunday when the backsliding Baltimore Colts battle the 2-13 Houston Oilers in the season finale for both clubs — but that's more than enough for the two head coaches involved.

"I think it's very important for this team or any team in this position to finish on a strong note," said Houston Coach Chuck Studley, who may be spending his last game on the sidelines with the Oilers.

"It's very important, particularly when you have young players, to finish the season like professionals and to play every game right down to the last one."

Baltimore Coach Frank Kush couldn't agree more. Kush was vehement following last year's Colts finale, a 34-7 pasting by the Miami Dolphins after which he accused his players of quitting.

This year's model, which features the youngest average age of any National Football League squad, has been just the opposite, said Kush, whose team has lost five straight since a 17-14 upset of the New York Jets in Shea Stadium.

"The players have had good work habits right along," Kush said. "We've practiced hard and they have a good attitude about this ballclub."

The Colts will once again rely on the National Football League's top-ranked rushing game against the Oilers, led by Curtis Dickey's 1,012 yards. The Colts are averaging 167.1 yards per game on the ground.

Baltimore's main offensive weapon remains rookie kicker Raul Allegre, who

barely missed a game-winning 64-yard field goal at the end of last week's 21-19 loss to the Denver Broncos. Allegre has nailed 28 of 33 field goals — tops in the AFC — and 20 of 22 extra points this season to rank second in the conference in scoring.

Houston's offense has been revitalized since Studley installed second-year man Oliver Luck at quarterback as the Oilers have won two of their last five games following an 0-10 start. As always, the key man for the Oilers remains tailback Earl Campbell, who has rushed for 1,208 yards and 12 touchdowns this year.

Studley said he was convinced his team wouldn't sleepwalk through Sunday's game, although a loss would guarantee them the No. 1 pick in the NFL draft and a shot at Nebraska running back Mike Rozier.

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Sports

Veteran tackle claims it's time for Saints to go marching in

By KEN RAPPOPORT AP Sports Writer

It might finally be time for the Saints to go marching in.

"It's the biggest game in the history of the New Orleans Saints' franchise," says veteran nose tackle Derland Moore. "And I ought to know, because I've been here for two-thirds of that history."

"The biggest game" is Sunday's National Football League contest with the Los Angeles Rams. The winner goes to the playoffs — the loser goes home.

The Saints have never been in the playoffs. In fact, they have never had a winning season in the 17 years since the team was formed.

"So many times I've felt

bitter, sitting home watching other people play on television," said Moore, an 11-year veteran having one of his best seasons with a rugged defense that leads the NFC. "You ask yourself why — why us? It got to where I didn't know if I was going to last long enough for it to come around."

A wild-card berth, at least, goes to the winner of the game. The Rams could even be champions of the National Conference West, with a victory coupled with a loss by San Francisco to Dallas Monday night.

The Saints and the Rams both have 8-7 records. The eight victories ties the Saints' record for most in a season and makes it possible for them to finish with a best-ever 9-7.

Along with the Saints and Rams, the Detroit Lions, Seattle Seahawks and 49ers also have a clear-cut path to the playoffs. All they have to do is win to get in. The Lions host Tampa Bay and Seattle entertains New England on Sunday.

Sunday's other games with playoff possibilities include Green Bay at Chicago, Buffalo at Atlanta and Pittsburgh at Cleveland.

In other action, Philadelphia is at St. Louis, Denver at Kansas City, San Diego at the Los Angeles Raiders and Houston at Baltimore.

In a Friday night game, Miami safety Mike Kozlowski returned two interceptions thrown by Richard Todd for touchdowns within a 61-second span of the fourth

In the White House's Lincoln Bedroom there is a copy of the Gettysburg Address, written out by Lincoln.

quarter as the AFC East champion Dolphins rolled to a 34-14 victory over the New York Jets.

The triumph, the ninth in 10 games for the 12-4 Dolphins, clinched the home-field advantage in their first playoff game. The Jets, who had no playoff chance even before the game, finished 7-9.

In games today, the New York Giants played at Washington and Cincinnati was at Minnesota.

If the Rams beat the Saints, they will need either a loss by the 49ers Monday night to win the NFC West or a San Francisco victory and a loss by either Detroit or Green Bay for a wild-card spot.

Detroit, 8-7, can clinch the NFC Central title by beating 2-13 Tampa Bay. But if the Bucs win, and Green Bay beats Chicago, the Packers would take the Central Division title and a spot in the playoffs. If both the Lions and Packers lose and finish at 8-8, Detroit would get the playoff spot.

Seattle, 8-7, has only to beat New England, also 8-7, to clinch the AFC's second wild card.

The Patriots can get an AFC wild-card spot by beating Seattle, while Cleveland loses to Pittsburgh. Cleveland, 8-7, could get the spot by beating Pitt-

sburgh if Seattle also loses.

Buffalo, 8-7, needs a victory, a Cleveland loss and a tie by Seattle and New England to make the playoffs.

San Francisco will win the NFC West by beating Dallas. If the 49ers lose and the Rams win, the Rams will be division champions, and if the 49ers lose and the Packers win, San Francisco will be out of the playoffs.

At any time over the past three weeks the Rams could have locked up at least the wild-card berth, but Los Angeles has lost two straight games, opening the door for the Saints.

Los Angeles Rams Coach John Robinson said his team can't get to thinking about past mistakes with so much on the line.

"The main thing is, you can't get that feeling of walking around on egg shells," he said. "We turned the ball over 13 times in the past two weeks. Going into the Philadelphia game, we were the best in the league at scoring once we got the ball inside the 30, and we've pretty well messed that up."

"But we've made over 700 yards in the past two games with 13 turnovers. We're moving the ball. We just seem to like to give it back every 10 minutes or so."

Dolphins use turnovers to score 34-14 victory over Jets

MIAMI (AP) — After interfering with two New York Jet passes and letting the holder run in a bobbled snap for an extra point, Mike Kozlowski had to do something to redeem himself.

Kozlowski did that and more Friday night by picking off two Richard Todd passes in the fourth quarter and running both back for touchdowns as the Miami Dolphins breezed by the Jets 34-14 in both clubs' final game of the National Football League season.

"I was upset at him (Kozlowski) because he didn't contain on the bad snap on the point after and the guy ran it around his side" to tie things up at 14-14 midway through the third quarter, said Coach Don Shula. "He more than made up for it with the two defensive scores."

Uwe von Schamann kicked field goals of 49 and 20 yards to nudge Miami ahead and then Kozlowski put the Jets away in a scant 61 seconds. He became only the 14th

player in NFL history to score twice in a game on interceptions.

The Dolphins, 12-4 and AFC East champs, have a week off before the playoffs. Their ninth victory in 10 outings assured the Dolphins their first playoff game will be in the Orange Bowl.

The Jets, a disappointing 7-9 after their fifth straight loss to Miami, go home. The two clubs met three times last season, the third time being for the American Conference championship that Miami won.

"It was a close game one moment, then in the course of about 20 seconds, we were way behind and out of it," said Jets Coach Joe Walton. "We had a lot of guys banged up."

"Towards the end of the game, we were looking around for a player healthy enough to run in the plays."

Miami quarterback Don Strock, filling in a second week for injured starter Dan Marino, threw touchdown

passes of 29 yards to Mark Duper and 2 yards to David Overstreet as the Dolphins built a 14-7 halftime lead.

In all, Strock connected on 16 of 30 passes for 174 yards, with one interception. Duper's four catches for 71 yards gave him 1,002 on the season, breaking the Dolphins' mark of 996 set by Paul Warfield 11 years ago.

Todd ended up with 19 completions and 230 yards on 36 throws.

I was the pair of thefts by Kozlowski, the backup safety who performs as the "nickel"

back in passing situations, that touched off a wild Dolphins celebration in the end zone with 8:38 to play.

Kozlowski grabbed a Todd pass intended for Jerome Barkum and sprinted 35 yards down the right sideline for a 27-14 lead at 9:39. Two plays and 1:01 later, the fourth-year pro out of Colorado snatched another Todd aerial in the middle of the field and followed the same route down the right sideline, this time 38 yards, to the touchdown.




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I wear a Super Bowl ring I won while with the Raiders, and can boast of scoring more than 50 touchdowns while gaining over 4,500 yards in my 10-year career. I was a Pro Bowl tight end five consecutive seasons.

ANSWER: Dave Casper, the former Notre Dame All-American who played for the Raiders and Oilers. He's now a Minnesota Viking.

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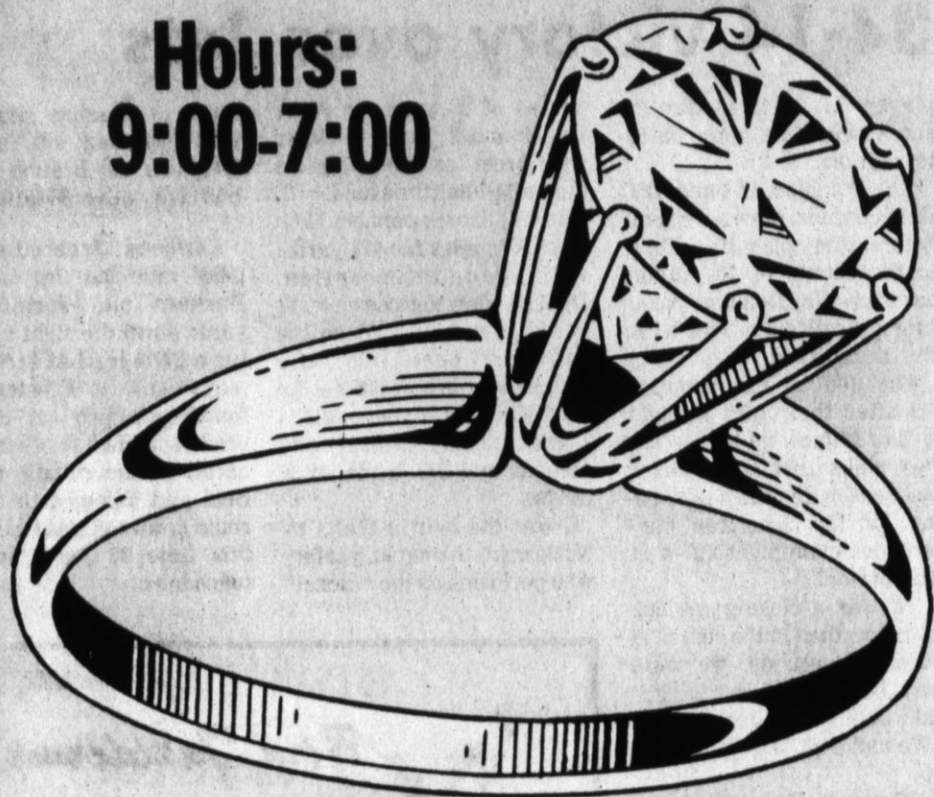
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Keeping secrets difficult during Christmas holidays

(Photo by Sandy Pankey)



Secrets are fun to share especially during the Christmas holidays. Three-year-old Nicole McWhorter whispers to her brother John what is in the package under the tree. They are the children of Ted and Cherry McWhorter.



Lifestyles

Schilling, Craig vows exchanged here Saturday

Wedding vows were exchanged by Marie Suzan Schilling of San Antonio and First Lt. Derrel "S" Craig of Ft. Polk, La. in an afternoon wedding ceremony Saturday in St. Anthony's Catholic Church of Hereford with the Rev. Frank Eldridge officiating.

The bride is the daughter of Mr. and Mrs. Edward Schilling of Summerfield and the bridegroom is the son of Mr. and Mrs. Bud Craig of Springfield, Mo.

White gladioli decorated the main altar of the church.

Barbara Schlabs served as maid of honor and First Lt. Bradley May of Ft. Polk was best man.

Serving as bridesmaids

were Carrie Moten of Amarillo, Linda Sanget of San Antonio, and the bride's sister, Theresa Walch, also of San Antonio.

Groomsmen included First Lt. Jeffrey Lamb, First Lt. James Clements and Cpt. Martin Whitaker, all of Ft. Polk. Guests were escorted by the bride's brother, Matt Schilling, First Lt. Thomas Brown and Terrance Bauer, both of Ft. Polk, and Trinidad Hernandez of San Antonio.

Nicole Schilling, daughter of Mr. and Mrs. Richard Schilling, was flower girl and ring bearer was Allen Schilling, son of Mr. and Mrs. Wayne Schilling of Slaton.

Ralph Detten and Karen

Zinser, vocalists, sang "Our Father," "Wedding Song" and "His and Hers" accompanied by organist, Cheryl Betzen, and guitarist, Trinidad Hernandez.

Given in marriage by her parents, the bride wore a polyester organza and sheer illusion bridal gown featuring a yoke trimmed with shiffl embroidery and pearls. It was also fashioned with long fitted sheer illusion sleeves the bodice, which dropped to a long waistline, was trimmed with embroidered chantilly lace, shiffl embroidery and pearls. The full skirt formed a chapel length train.

The chantilly lace bridal view edged in scalloped lace and lace appliques was attached to a lace headpiece. She carried a white camellias bouquet with burgandy rose buds.

Bridal attendants wore cranberry moire taffeta tea length gowns tied with gray sashes and matching gray shoes.

Phyllis Kahlich of Amarillo invited guests to register at the reception held in St. Anthony's cafeteria.

Donna Schilling of Dimmitt and Eileen Schwertner of Amarillo served wedding cake and Denise Albracht poured punch and coffee.

The couple left for a wedding trip to Las Vegas, Nev.

They will make their home after Dec. 26 in Ft. Polk.

The bride received her bachelor of arts degree in elementary education from St. Mary's University in San Antonio where she was a member of Alpha Sigma Tau Social Sorority.

The bridegroom received a bachelor of science degree in sociology from Southwest Missouri State University in Springfield. He is currently serving as an officer in the U.S. Army at Ft. Polk.

Out-of-town wedding guests were represented from San Antonio, Colorado, Hobbs, N.M., Louisiana, Slaton, Oklahoma, Missouri and Arkansas.



MRS. DERREL "S" CRAIG
...nee Marie Suzan Schilling

New officers installed during Christmas party

The Westway Extension Homemakers Club met Tuesday night in the home of Nancy Nixon for a Christmas party and installation of officers.

Members enjoyed homemade candies, cookies, cheese balls, dips and chips topped off with hot cider and coffee.

A short business session was conducted by Mrs. Nixon, after which Leta Kaul gave the members a presentation on the history of the Bi-

ble. The theme for Westway for the year 1983 was the "Year of the Bible."

Mrs. Kaul used Proverbs to install each new club officer. The members exchanged homemade gifts following the installation.

Other members present were Joan Bookout, Grace Covington, Carolyn Evers, Marjorie Thomas, Gayle Carter, and Martha Rickman.

The next meeting will be on Jan. 17 at K-Bob's, Dutch treat.



The first issue of the famous Army newspaper, "Stars and Stripes," was published on February 8, 1918.

Area News Briefs

Frona - Payment of the bill for the new roof which was applied to the courthouse was one of the main items of business for the Farmer County Commissioners' Court on Nov. 28.

The bill amount was \$13,490 and the contractor was Leaway Roofing of Hereford.

Littlefield - Lamb County gins have turned out 5,069 bales of cotton before Nov. 1., according to the U.S. Department of Commerce, Bureau of the Census.

Preliminary statistics were revealed Thursday, Nov. 10.

According to the report, only 2,621 bales had been ginned in Lamb County by the same time in 1982.

The report shows that there were 3,348,062 bales ginned in the United States through Oct. 31 from the 1983 crop, compared with 5,288,435 for 1982.

Canyon - The Canyon Independent School District board authorized the go-ahead to explore purchasing an in-house computer system for the district.

School officials will start looking at specific systems and make recommendations to the board early next year on a computer that can handle the business needs of the district.

Mike Hay, CISD business manager estimates an in-house computer will cost about \$218,000 over the next five years.

Tulla - In a joint meeting of the airport board, city council and commissioners court approval was made for the airport board to seek a \$34,000 grant from the Texas Aeronautics Commission for seal coating and restoring the airport runway and a grant-loan of \$25,000 for construction of T-hangers at the north end of the runway...20 year pay-out at five percent interest.

Dimmitt - The ETSI (for "Energy Transportation Systems, Inc.") coal slurry pipeline project will be under consideration soon by the Texas Railroad Commission.

The ETSI pipeline project plans to apply to the RR commission for a certificate of public convenience and necessity to construct and operate a pipeline for the transportation of low-sulphur coal. The proposed pipeline would start at the Powder River Basin of Wyoming and Montana and go to electric generating facilities in Kansas, Oklahoma, Louisiana and Texas.

The pipeline would dissect 38.6 miles of Castro County starting in the northeast corner and going to the southwest corner.



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Today in History

Today is Sunday, Dec. 18, the 352nd day of 1983. There are 13 days left in the year. Today's highlight in history:

On Dec. 18, 1865, the 13th Amendment to the Constitution was adopted, abolishing slavery.

On this date: In 1787, New Jersey became the third state to ratify the U.S. Constitution.

In 1799, George Washington was buried at Mount Vernon, Va.

In 1886, Hall of Fame bat-

ting star Ty Cobb was born. And in 1915, President Woodrow Wilson married Edith Bolling Galt at her home in Washington.

Ten years ago: Nelson Rockefeller resigned as governor of New York and was succeeded by Lieutenant Governor Malcolm Wilson.

Five years ago: The National Aeronautics and Space Administration abandoned plans to try to save the Skylab space station, saying it would let the craft plunge to a fiery death in the atmosphere.

One year ago: The Soviet Union issued a statement strongly denying there had been any complicity by Moscow in the attempt to assassinate Pope John Paul II.

Today's birthdays: Former Attorney General Ramsey Clark is 56.

Thought for today: "I am not young enough to know everything." — James Barrie, Scottish writer (1860-1937).

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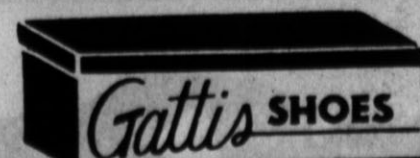
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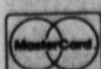
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To Perform Today

"Specially For Shepherds" is this year's program at the First Christian Church in Hereford. Choir members pose above. They

are to sing beginning at 10:50 a.m. today at the 401 W. Park Ave. church.

Louise's Latest

By LOUISE WALKER
County Extension Agent
Christmas, like no other season, brings out our most cherished memories of foods we have enjoyed through the years.

The following recipes feature oats. After using the oats, oatmeal tubes make an excellent container for gift cookies or popcorn treats. Use leftover fabric, wrapping paper, ribbons, or ornaments to decorate. Be creative!

HARVEST PUMPKIN PIE

Crust
1 cup long cooking oats
1 cup all-purpose flour
½ cup packed brown sugar
½ cup butter or margarine, melted

Filling
2 eggs, slightly beaten
1 teaspoon ground cinnamon
½ teaspoon salt
½ teaspoon ground ginger
¼ teaspoon ground cloves
1 16-ounce can pumpkin
1 5 and one-third ounce can (two-thirds cup) evaporated milk
Two-thirds cup granulated sugar

Topping
¼ cup long cooking oats
¼ cup chopped pecans
1 tablespoon brown sugar
1 tablespoon butter or margarine, melted

Combine oats, flour, brown sugar, and butter. Pat into bottom and up sides of a 9-inch pie plate or 11-inch quiche pan.

For filling, combine eggs, cinnamon, salt, ginger, cloves, pumpkin, evaporated milk, and sugar. Pour into crust.

For topping, mix together oats, pecans, brown sugar, and butter till crumbly. Sprinkle atop pumpkin filling. Bake in a 350 degree oven for 50 minutes or till knife inserted near center comes out

clean. Serve with sour cream or whipped cream.

EGGNOG BREAD

1 cup quick cooking oats
1 ¾ cups all-purpose flour
1 teaspoon baking soda
1 teaspoon ground nutmeg
½ teaspoon salt
¼ teaspoon baking powder
½ cup butter or margarine, softened
¾ cup granulated sugar
2 eggs
1 cup eggnog (commercial or homemade)

In small mixer bowl stir together oats, flour, soda, nutmeg, salt, and baking powder; set aside.

In large mixer bowl, beat butter and sugar till light. Add eggs; beat well. Add oat mixture and eggnog alternately to creamed mixture, beating till smooth after each addition.

Pour batter into three 5x3x2 inch loaf pans or one 9x5x3-inch loaf pan. Bake in a 350 degree oven about 45 minutes. Cool 10 minutes before removing from pan; cool completely on wire rack. Decorate as desired.

CRANBERRY COFFEE CAKE

¾ cup quick cooking oats
2 ½ cups all-purpose flour
2 teaspoons baking powder
1 teaspoon baking soda
¼ teaspoon salt
½ cup butter or margarine, softened

1 cup granulated sugar
3 eggs
2 teaspoons vanilla
1 cup (8 ounces) dairy sour cream
2 cups (16 ounces) whole berry cranberry sauce

Glaze
1 cup (8 ounces) whole berry cranberry sauce
2 tablespoons granulated sugar
1 tablespoon corn starch
2 tablespoons cold water
1 cup cranberry sauce is

layered within the cake and the remaining cup is used in the glaze.

Mix together oats, flour, baking powder, soda; and salt; set aside. Cream butter. Gradually beat in sugar till light. Add eggs, one at a time; beat well. Add vanilla. Add oat mixture and sour cream alternately to creamed mixture, beating till smooth after each addition.

Spoon one-third batter into greased bundt pan or 9-inch tube pan. Spread ½ cup of cranberry sauce over batter. Repeat once more, ending with batter.

Bake at 350 degrees for 35-40 minutes or until golden brown. Let cool 5 minutes before removing from pan. Drizzle glaze over top.

For Glaze: Mix together 1 tablespoon cranberry sauce, cornstarch, and water. Set aside. In a small saucepan, combine remaining cranberry sauce and sugar. Bring to a boil. Add cornstarch mixture, stirring constantly. Boil 2 minutes or till clear.

HOLIDAY BARS

1 9-ounce package dry mincemeat
1 cup water
½ cup shortening
1 cup packed brown sugar
1 ½ cups quick cooking oats

1 cup all-purpose flour
½ teaspoon salt

In a saucepan, bring water to a boil. Break apart mincemeat into boiling water stirring constantly for 5 minutes. Remove from heat.

In a small mixer bowl, cream shortening and sugar till light. Add oats, flour, and salt; mix well. Spread half of the oat mixture in the bottom of a greased 9x9x2-inch pan. Press down firmly. Spread mincemeat atop. Top with remaining oat mixture and press into mincemeat.

Bake in a 350 degree oven for 30 to 40 minutes or until golden brown. Cool completely; cut into small bars. Makes about 2 ½ dozen bars.

Educational programs conducted by the Texas Agricultural Extension Service serve people of all ages regardless of socio-economic levels, race, color, sex, religion or national origin.

If there's a place for everything and you put everything in its place, what do you do with all the stuff that's left over?

If the ball seems to come right out of the TV picture, either you have the first three-dimensional TV or you're mixing the drinks too strong.

APPLAUSE III

Has Arrived

In Polyester Silky Look, Black and White A Good Look For the Holidays.



Soft separates in the Marge Kane manner.

We Also Have Reduced Merchandise For Holiday Sales.

Little's
237 N. Main

Use Your Visa, Master Charge, or Little's Charge. Free Gift Wrapping.

Ann Landers

For women only



DEAR READERS: I apologize to my male audience today, but the first letter is strictly for women. Skip to the second letter, then go directly to the sports section.

DEAR ANN: I read a letter in a magazine recently written by a woman who said, "Pantyhose are bad, bad, bad!" She had been hospitalized for two weeks with an acute infection. Her doctor claimed the infection was caused by pantyhose.

The woman went on to explain that pantyhose do not permit all parts of the body to "breathe." She said her physician recommended that she go back to hosiery and garters.

My wife often gets yeast infections. She wears pantyhose. Could this be the cause? She also has trouble in the winter because her legs itch and become scaly.

When I showed her the letter in the magazine she got angry and yelled, "Pantyhose are comfortable! I wouldn't go back to stockings for anything." She accused me of looking at too many racy magazines with photos of girls wearing garterbelts, and said old prostitutes go for that sort of thing.

What about this, Ann?—Oil Country Correspondent

DEAR OIL: Women have been getting yeast infections for hundreds of years. When pantyhose first made their

debut, some physicians blamed pantyhose. Most of the women who went back to stockings and garters continued to get yeast infections anyway, so they returned to pantyhose. Conclusion: Females who are prone to yeast infections will get them whether they wear pantyhose or not.

I assume the women who read this have sense enough not to sleep in pantyhose. In other words, they should not be worn 24 hours a day. Also, I assume pantyhose wearers bathe or shower every day and wash their pantyhose after each wearing.

As for legs that itch and become scaly in winter, a daily application of cream or lotion will almost always solve the problem. The itching and scaling is caused by dry skin.

DEAR ANN LANDERS: I am a woman in my late 60s, very much alone, although I have a son who is a successful attorney and a very attractive daughter. Both are married, living in another city and have families of their own.

When my children were growing up, I gave them everything. They went to the best schools and wore expensive clothes. I saw to it that they had the same luxuries their affluent friends enjoyed, although we were far from wealthy. (I worked part-time to give them the best while I wore bargain-

basement dresses and spent very little on myself.)

My fancy daughter never invites me to spend the holidays with her and neither does my professional son although they know I am alone. I am bitter and resentful. Where did I go wrong?—A Mother In Maine

DEAR MOTHER: The answer is found in your letter: "I gave my children everything—while I wore

bargain-basement dresses." Such sacrifices are seldom appreciated. They invariably produce selfish, spoiled inconsiderate children—and that's what you have.

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Remember to redeem your Helen's Funny Money by Saturday, Dec. 24.

Helen's
It's all for you.

417 N. Main

364-3221

Hi, It's not too late to order your fruit, bread, spice or any of the other gift baskets. Call me at 364-2520 night or day and I'll deliver your Christmas Basket. Merry Christmas

Gift Baskets—Unlimited
Mary Shelton—owner



MRS. ROGER GLEN WILLIAMS
...nee MarilynKay Brazell

Brazell, Williams wed here Saturday afternoon

The First Baptist Church was decorated with a 17-branch brass candelabrum entwined with greenery and accented with a rose colored bow.

Bob Wear of the Central Church of Christ officiated at the ceremony.

The bride is the daughter of

Mr. and Mrs. R.E. Monical of 717 Irving. Parents of the bridegroom are Mr. and Mrs. Glen C. Williams of Lovington, N.M.

Mrs. Benny Strickland of Sundown served as matron of honor and Max Fort of Lovington was best man.

Bridesmaids included Mrs. Cliff Wilson of Higgins, sister of the bride, and Mrs. Jon Hendrickson. Groomsmen were Barry Roberts and Jon Hendrickson.

Randy Allmon and Lynn Cook escorted guests to the pews and lit the candles. Ring bearer was Trenton Brazell, son of the bride.

Dwight Joiner of Dimmitt played selections on the organ, Cliff Wilson of Higgins, the bride's brother-in-law, sang "The Lord's Prayer" and Mrs. Wesley Gully sang "My Heart at Thy Sweet Voice."

Given in marriage by her sons, Russell and Brandon Brazell, the bride wore a floor-length gown of ivory lustrous polyester knit. The Edwardian style dress featured an accordion pleated skirt, lace overblouse of point d'esprit lac with stand-up collar, hand sewn cameo design on front yoke and long sleeves with deep cuffs.

She wore a picture hat accented with rose colored flowers and carried a semicascade of burgundy and rose carnations with English ivy.

Her attendants wore burgundy Edwardian style floor-length dresses of lustrous polyester knit with lace stand-up collars, front and back yokes of point d'esprit lace and deep flounce capelets of d'esprit lace. They were styled with empire waists and flared skirts.

They carried hand bouquets of rose carnations tied with burgundy ribbon.

Jana Williams, sister of the groom from Norman, Okla., registered guests at the reception held in Kinsey Parlor.

Mrs. Kandy Galvan of Seminole and Mrs. Johnny

Butler served cake. Punch and coffee were served by Mrs. Charles Melban of Dumas and Mrs. Connie Hart. Also assisting were Mrs. Bud Eades and Mrs. Charles Minchew.

The two-tiered wedding cake was trimmed with crystal accessories and rose colored roses, and was topped

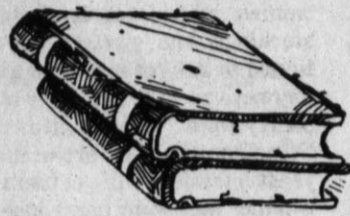
with a porcelain figurine which was a gift from the bride's parents.

The bride and groom wore matching burgundy sweaters and jeans as they left for a wedding trip to Santa Fe, N.M. They will be at home at 110 W. 9th St. after Dec. 20.

The bride is a graduate of Hereford High School and

West Texas State University. She is currently a teacher at La Plata Junior High School.

The bridegroom graduated from Lovington High School and Eastern New Mexico University. He is presently employed at William E. Allen, Inc., C.P.A. He is a member of Kiwanis and Toastmasters.



Between the Covers

By DIANNE PIERSON
County Librarian

Novels head the list of new books available this week at the Deaf Smith County Library. "Trinity's Child" by William Prochnau is a novel of the Third World War, the most chillingly authentic nuclear holocaust novel since "On The Beach." It is a book you will never forget, because it could happen this way.

In Washington, a courageous president digs his way out of rubble to battle his own successor for the survival of mankind...in the skies over a crippled America, a crusty general and a patrician admiral take matters into their own hands.

Meanwhile, an ancient B-52, carrying nuclear warheads, drones over the Arctic wastes toward Russia. In the cockpit, Kazaklis, the smart-talking, womanizing jet jockey, and Moreau, his strong-willed female co-pilot. They are out of radio contact, with a crew cracking under the strain, and they mistrust each other almost as much as they mistrust themselves in making a decision that could end the world.

In this premier novel, distinguished journalist William Prochnau has woven a gripping, terrifying tale of humanity's greatest menace.

"Blood and Orchids" by Norman Katkov tells the majestic tale of love and betrayal, murder and justice, set in the exotic Hawaiian territory a decade before Pearl Harbor.

The Hawaii of 1930 is a colonial paradise: the soft winds and smooth seas had lured the white man to these seductive islands and the presence of cheap kanaka labor encouraged him to stay. Five families now control all the wealth of the islands while the U.S. Navy patrols the vast Pacific from its base at Pearl. The genteel facade of life in the American territory is suddenly and savagely

shattered.

Hester Ashley Murdoch, the young society wife of a Navy lieutenant, is found battered and bleeding on a lonely beach road and unjustly accuses four local boys of rape and assault. On her identification the boys are brought to trial amidst unprecedented media attention from the outraged Mainland, defended only by a scared young kanaka lawyer, Tom Halehono.

Norman Katkov has given us an epic drama of panoramic scope and riveting urgency as well as a story of two great loves that fate tries in the crucible as personal and social upheaval.

Other new books available this week at Smith County Library are "Giving Time a Chance" by Ronna Romney, "The Complete Book of Allergy Control" by Laura J. Stevens, and "A Valuable Property" by Michael Todd Jr. and Susan McCarthy Todd.

LIBRARY EVENTS: 10 a.m. Thursday, public story hour - Bring your children to the library to have a visit with Santa this week!!



In England, from the 7th to the 13th century, the year was reckoned from Christmas day.



The state of Alaska, the nation's largest, has a population smaller than New York City's borough of Staten Island.



Joan Coupe

For the skier, nothing can quite match the splendor that is Switzerland. Although Switzerland has changed little since the 1930's, three resorts, Wengen, Verbier and Saas-Fee, are places where images of that glamorous age live on. Each is completely different from the other and represents the best of its type. If you have only a week, choose the one that suits your style and budget. If you have more time, visit two or three and sample the variety of forms a Swiss village can take. In Wengen, the hotels have the luxury and deft service of prewar times. Verbier is the most modern, with an action-filled nightlife and excellent skiing. Saas-Fee is a simple farming village with a quiet lifestyle.

Whether it's planning a skiing trip to Switzerland or a business trip to California our travel consultants at HEREFORD TRAVEL CENTER will handle all the details. There is never any extra charge to you for our services and in fact many times we have even saved our clients money. You'll find us at 144 W. 2nd, 364-6813. Most major credit cards honored. Open: Mon.-Fri. 8:30-5:30, Sat. 9-12. Member of ASTA. A very Merry Christmas to you and yours!

Wengen is situated in the most spectacular mountains in all of Switzerland.

Fat Walker's Celebrates YOUR CHRISTMAS EARLY In HEREFORD with SPECIAL OFFER!

(Bring this check with you!)

THIS CHECK TO BE APPLIED TOWARDS YOUR COST OF A TOTAL FIGURE CORRECTION	New Programs Only!
Pay TO THE ORDER OF MISS OR MRS.	\$50.00
The Sum \$50 DOLS 00 CTS	DOLLARS
Good Through Dec. 31, 1983 LIMIT—One Check Per Person	<i>Fat Walker's</i>

Gladys Conway's True Story:

I never worried about my weight, until my husband started telling me a couple of years ago that I needed to slim down. He was right. At 170 pounds, I was just too heavy. I was determined to get rid of that weight, and since a friend of mine was having a lot of success at Pat Walker's I started going there, too.

Now I'm the successful one! I'm down to 112 pounds, and I've lost a total of 68 inches — ten inches from my waist alone. I love the way my figure has stayed firm and smooth all along...Pat Walker's Symmetricon passive exercise unit takes care of that.

Pat Walker's program has made a big difference for me. I'm sure it will for you, too.

CALL NOW FOR YOUR



LOST 58 LBS. & 68 INCHES

FREE COURTESY TREATMENT & FIGURE ANALYSIS!

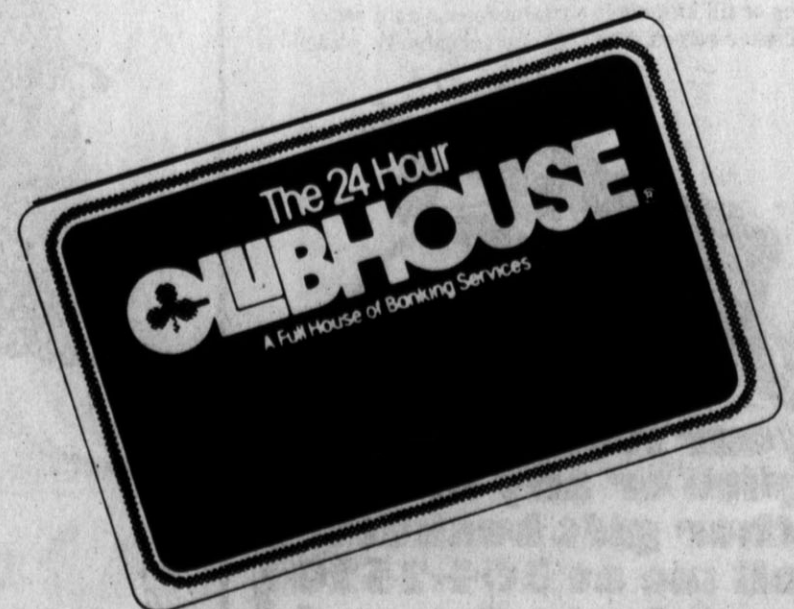
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Hereford

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Candy Cane Tree

The local chapter of the American Lung Association has currently has its candy cane tree set up at Sugarland Mall. When donations are given, the donor's name is printed on a candy cane and hung

on the tree. Various groups and clubs provide volunteers for the annual project. Volunteers from La Madre Mia Study Club are, from left, Betty Taylor and Ruth Black.

Installation held last Thursday

Installation of new officers was held during the annual Christmas party of the Wyche Extension Homemakers Club on Thursday. The event was held in the home of Louise Packard.

Past President Gene Holden conducted an impressive installation service using the bee hive theme, linking each officer to the bee hive and giving instruction to each on how to "bee" a loyal member to the hive.

Those installed were Clara Trowbridge, president; Argen Draper (stand in Nancy Duncan), vice-president; Mildred LeFever, secretary-treasurer; Carol Odom, council delegate; and Esther Thuett (stand in Beverly Brooke), reporter.

The program was presented by Ms. Brooke, who read "A Christmas

Gift exchange held at coffee

The Dawn Extension Homemakers Club met for a Christmas coffee at the home of Mrs. J.B. Caraway this week. Each member brought a handmade Christmas decoration for the gift exchange.

During a brief business meeting, members discussed the quilt which will be given away at the Dawn Community Christmas party Friday night. Appreciation was expressed to all who contributed and made the club project a success.

Cindy Burns gives interior design program

Cindy Burns presented a program on interior design to members of Alpha Iota Mu Thursday evening in the home of Mary Kay Hagar. She gave pointers on furniture, carpet and wall decorating.

Members were reminded about working Monday at the mall for the Lung Association's Christmas tree.

After the business meeting the group enjoyed a Christmas party. Refreshments were served and Secret Sisters exchanged Christmas gifts.

Calendar of Events

MONDAY

Odd Fellows Lodge, IOOF Hall, 7:30 p.m.
TOPS Chapter No. 1011, Community Center, 5:30 p.m.
Rotary Club, K-Bob's Steak House, 12 noon.
Overeaters Anonymous, Faith Assembly of God, 7 p.m.
Evening Lions Club, K-Bob's Steak House, 7:30 p.m.
Order of Rainbow for Girls, Masonic Temple, 7:15 p.m.
VFW Auxiliary, VFW Clubhouse, 7:30 p.m.
El Llano Study Club.
American Association of University Women, 7 p.m.

TUESDAY

Merry-Go-Rounds Round Dance Club, Community Center, 8 p.m.
Hereford Rebekah Lodge No. 228, IOOF Hall, 7:30 p.m.
Free immunizations against childhood diseases, Deaf Smith County Public Health Clinic, 902 East 4th St., 8 a.m. to 12 noon and 1-3:45 p.m.
Deaf Smith County Historical Museum: Regular museum hours Tuesday through Saturday 10 a.m. to 5 p.m. and Sunday 2-5 p.m. Museum closed Monday.

Club meets for holiday dinner

The Merry Mixers Square Dance Club held a Christmas dinner at the Community Center prior to the regular Thursday evening dance.

Ed Line gave the invocation and the meal was served by Savage's Barbecue from tables decorated with a Christmas theme.

Freddie McKee called tips and Al Harris cued the rounds

Planned Parenthood Clinic open at 711 25 Mile Ave. from 8:30 a.m. to 3 p.m.

TOPS Chapter No. 576, Community Center, 9 a.m.
Baptist Women of Summerfield Baptist Church, at the church, 9 a.m.
Xi Epsilon Alpha Chapter, Beta Sigma Phi, 7:30 p.m.
TouJours Amis Study Club, 7:30 p.m.
Westway Extension Homemakers Club, 7:30 p.m.
Multiple Miracles Chapter, Mothers of Twins Club, Reddy Room, 7:30-9:30 p.m.

Hereford Board of Realtors, lunch at Country Club, 12 noon.

Ford Extension Homemakers Club, 9:30 a.m.

WEDNESDAY

Noon Lions Club, Community Center, noon.
Country Singles Square Dance Club, Community Center, 8 p.m.
Knights of Columbus at KC Hall, 8 p.m.
Christian Women's Fellowship, First Christian Church, 12 noon lunch.

THURSDAY

Hereford Study Club Christmas party, home of Jean Ballard, 7:30 p.m.

at the dance which followed.

The following guests were introduced: Mr. and Mrs. Ross Hazelrigg of Barry, Ill.; Jeff, Renee and Jeremy Blaylock; Ronnie and Nina Brown; and Leona Kimball.

Lessons are cancelled next week but will be held at 7:30 p.m. Dec. 29 followed by a regular dance at 9 p.m.

Anniversary reception set

Mr. and Mrs. Ulys Pierce, 216 Fir, will celebrate their 50th wedding anniversary from 2 to 4 p.m. Sunday in the Central Church of Christ fellowship hall. Friends are invited to the reception.

Kiwanis Club, Community Center, noon.

TOPS Club, No. 941, Community Center, 9 a.m.
Amateur Radio Operators, north biology building of high school, 7:30 p.m.
Story hour at the library, 10 a.m.

San Jose prayer group, San Jose Mission - Labor Camp, 8 p.m.

Al-Anon, Odd Fellow Hall, 8:30 p.m.
Free immunizations against childhood diseases, Deaf Smith County Public

Health Clinic, 902 East 4th St. 8 a.m. to 12 noon and 1-3:45 p.m.

Men's Study Group, St. Thomas Episcopal Church, 7:30 p.m.

Calliopian Study Club, 7:30 p.m.

Sweet 'n' Fancy Cake Decorating Club, Community Center, 9:30 a.m.

Sugar Works Cake Decorating Club, American Legion Hall, 7 p.m.

Messenger Extension Homemakers Club, 2 p.m.

FRIDAY

Kiwanis Whiteface Breakfast Club, Savage's Hickory Pit, 6:30 a.m.
Community Duplicate Bridge Club, Community Center, 7:30 p.m.

EXERCISE DAILY
\$10.00 per month
Larrymore Studios

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Veterans Memorial Park



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PRE-CHRISTMAS SALE PRE-CHRISTMAS SALE

1/3 Off

J.G. Hook
Young Boys & Preteens

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Holiday Dresses
(In Junior Sizes)

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Holiday Sweaters

This Merchandise Will Be On Sale Until
Stock Is Completely Cleared-Out

We Also Have New Spring Items
Perfect For Christmas Gifts.

PRE-CHRISTMAS SALE PRE-CHRISTMAS SALE



Children in Northern Europe believe that special elves in white beards and red caps come visiting at the Yuletide season. Children leave bowls of porridge outside the kitchen door for the elves and the porridge is always gone by morning.

Opening Soon

Reece's Antiques

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*A Special Gift
For A Special Person!*

Original Oil Paintings for Christmas
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Register now for classes
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Texas Gallery

Hwy 60 364-5571
P.O. Box 862 Hereford, Texas.

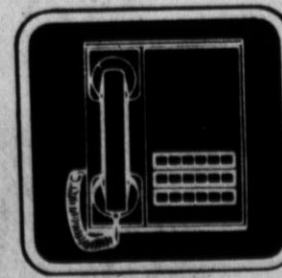
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CHRISTMAS



The Vogue

211 N. Main

364-0522

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Appliance Dealer
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Phone: 364-1588

All Recliners
In Stock
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Don't Forget!
Shop Hereford First!

Shorts Furniture

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One-Gr
**Angel Fl
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Sizes: 26-

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\$12

Antho C. R. ANTH

Downto

303 N. Main

All the employees at Sears Roebuck Co. wish to thank all their friends & customers for a wonderful year.

We look forward to serving you again in the future. Have A Merry Christmas & A Happy New Year! Shop Downtown Hereford First!

Sears

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364-3854

**New Shipment of Panasonic
Radios, Head Phones,
Cassette Players,
Clock Radios, Stereos, &
Recorders just arrived!
Late shipment from
manufacturer.
All specially priced!**

McKnight HOME CENTER

226 N. Main, Hereford 364-4051

We would like to thank all of our friends & customers for their patronage & support throughout the years.

Have a Merry Christmas & a safe New Year!

Bill & Regina Kester

We want to take this opportunity to wish our customers a Merry Christmas and to thank each and every one of you for making the first year of our new store a good one. We will continue to do our best to provide you with the best service and quality merchandise. Thank you for your pleasant shopping atmosphere.

We sincerely appreciate

Mary and

Gifts from the

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See all of our friendly merchants Downtown!

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All Batteries
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25% off
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Take this opportunity to
celebrate a Merry Christmas
each and every one of
us during the first year in our
new good one. We will
do our best to offer you
quality merchandise in a
warming atmosphere.

Truly appreciate you.

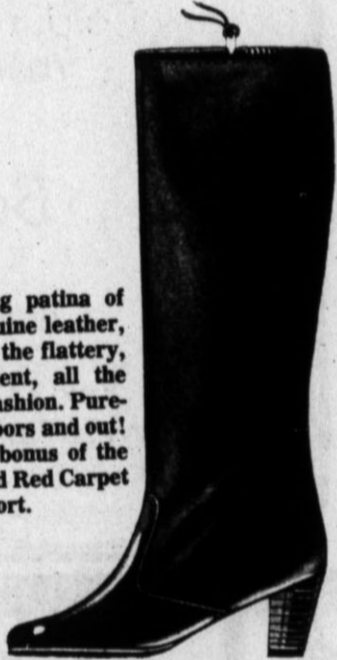
Carolyn

Gifts from the Heart

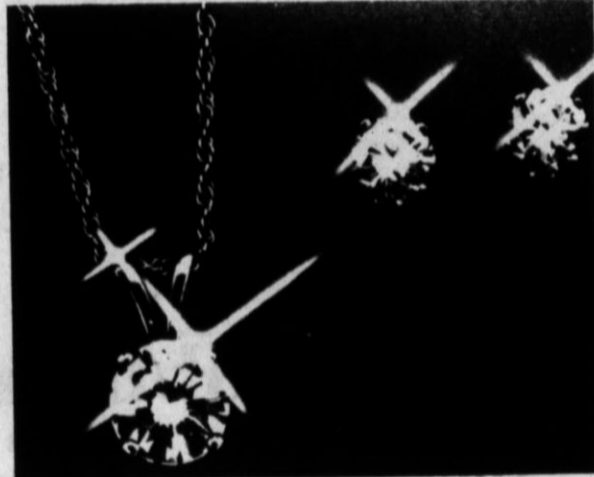
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With a gleaming patina of
buttery-soft genuine leather,
this boot has all the flattery,
all the refinement, all the
quality of high fashion. Pure-
bred beauty indoors and out!
Plus the added bonus of the
original patented Red Carpet
cushion of comfort.



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FOOTWEAR**
Fashion At Your Feet -
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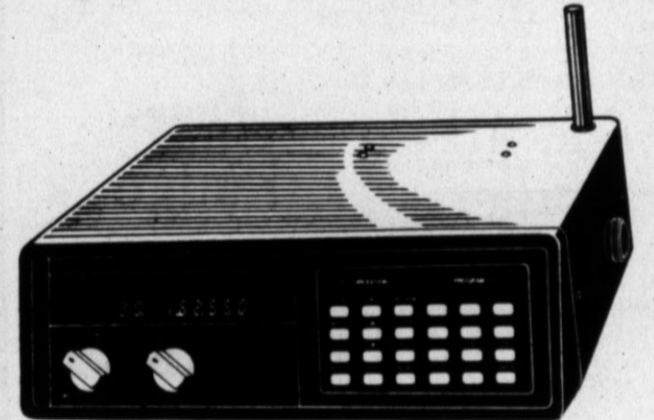


When you purchase a classic diamond pendant, we'll give you
-FREE - a dazzling pair of diamond earrings. It's our way of
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1/5 ct. \$325 / FREE 1/10 ct. \$125 value
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20 Channel Scanner Receiver

\$279⁹⁵

Kerr Electronics
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**Downtown
Variety Park
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Dawson recognized for achievements

Terese Dawson, 17-year-old daughter of Mr. and Mrs. Reese Dawson and granddaughter of Mr. and Mrs. Earl Lance and Mrs. J.M. Dawson, was recently selected Special Acteen of the Amarillo Baptist Association for her achievements in church and mission work.

Acteens is an organization for girls from grade seven to 12 in Southern Baptist churches. The main emphasis is on promotion and study of missions.

Miss Dawson will be honored by the Southern Baptist Convention of Texas on Jan. 21 in Dallas along with the young women who were selected by other associations within the state. Ten top girls will be named to serve on a panel.

Four of these young women will be chosen to act as hostesses for the four-day National Acteen Convention in Fort Worth in July of 1984. These four will also be of-

Newcomers hold dinner

Approximately 30 persons attended a progressive dinner sponsored by Hereford Newcomers Club Tuesday evening.

Hors d'oeuvres were served at the home of Mr. and Mrs. Ron Barnes. The group gathered for the main course in the home of Mr. and Mrs. Dino Barela, where Christmas tree ornaments were exchanged. Guests were treated to dessert at the home of Mr. and Mrs. Boyd Bulger.

The next meeting of Hereford Newcomers Club will be Jan. 10 at K-Bob's Steak House.



The first representative assembly in America convened at Jamestown, Virginia, July 30, 1619.

ferred four-year scholarships from the University of Houston.

Miss Dawson qualified for selection by completing steps one and two in Studiact, an individual achievement plan for Acteens. Each step included 27 activities encompassing mission study, support, organization and action.

For the first level of achievement, "Queen," she received a crown, and for the second, "Queen with a sceptre," she received a sceptre.

Miss Dawson studied the church and association, learned about missionaries and the scripture, had a prayer partner, wrote papers on "My Christian Growth" and "The Biblical Basis of Missions," and gave a five minute talk entitled "Values of an Acteen Meeting" to the associational board in Amarillo.

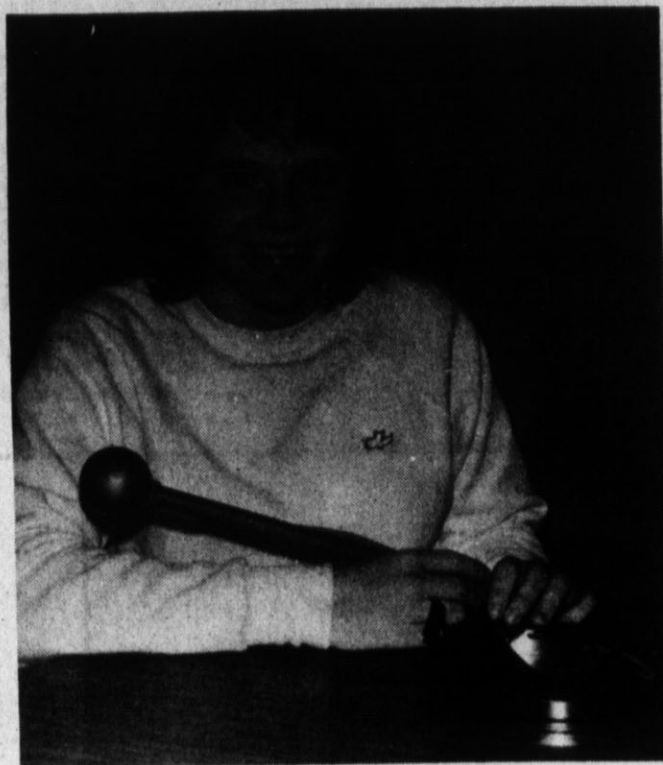
She is a member of Summerfield Baptist Church and is a senior at Hereford High School, where she is president of the Industrial Arts Club and a member of Student Council and National Honor Society.

In September of 1982 she went to Brazil as a participant in the mission partnership between Texas Baptists and Brazil. After graduation she plans to attend Hardin Simmons University in Abilene.

Fudge
Fudge
Fudge
Fudge

THE BRASS SPIKE

421 N. 25 Mile Ave.
364-7122



Terese Dawson
...with crown and sceptre

Wedding vows spoken

Renee Payne became the bride of David Zinser Friday morning in the First Presbyterian Church with the Rev. George Belford officiating.

The bride is the daughter of Dr. and Mrs. Gerald Payne of 237 Ranger and the bridegroom is the son of Mr.

and Mrs. Frank Zinser of Route 5.

The couple will make their home at 104 Redwood.

Jean Harlow and Clark Gable appeared together in six movies during the 1930s. The first movie was, ironically, titled *The Secret Six*.

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'The Store' a tedious look at famed Dallas department store

NEW YORK (AP) — Anybody tuning in to tonight's broadcast of "The Store," thinking it might be the Marx Brothers' movie of almost the same name, will be disappointed.

Instead, "The Store" on public TV is a tedious and elitist examination of the inner workings of Neiman-Marcus, Dallas' famed department store.

The documentary could benefit from Harpo, Chico and Groucho roller-skating through the halls, as they did in "The Big Store," providing the locale and the film some much-needed humor and humanity. Both are sadly lacking in the latest of Frederick Wiseman's point-and-shoot documentaries.

Wiseman's cinema-verite style scorns the use of a narrator who could provide better explanation of a subject. Without any guide or identifying graphics, the film takes on more profound shadings than it deserves. The images gain greater importance merely because they're on film.

For example, if Wiseman's camera and microphone details a sales meeting — and there are many meetings here — viewers may assume that it is a meaningful slice of life or a pointed statement on American business, when it is merely an uninteresting sales meeting.

The film never really addresses HOW Neiman-Marcus works, just that it works. There are scenes of customers looking at \$42,000 bracelets in the jewelry department, employees punching a timeclock and executives discussing whether to advertise on TV. "Every time we touch TV we go through the roof," an executive says.

Wiseman has won three Emmy awards for his previous examinations of American institutions, which have included profiles on juvenile court, a hospital and

the welfare system. While these films had some social significance, "The Store" merely showcases the wealthy without analyzing their excessive tastes.

An executive tells a story about a woman who was afraid to face a Neiman-Marcus executive at a Dallas Cowboys football game because she was wearing a fur coat bought somewhere else. She spent the game in

the ladies' room.

One manager, preparing her sales troops for the pre-Christmas barrage, conducts an exercise class for the most important selling muscles. The saleswomen are seen toning their smiles and fingers.

It's not exactly aerobics, and they don't display the enthusiasm of a Richard Simmons workout, but at least they're not in a meeting.

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La Madre Mia members hold Christmas party

La Madre Mia Study Club's annual Christmas party was held recently in the home of Joyce Allred. Members were served refreshments by co-hostesses Jeri Bezner, Sharon Hodges, Marlene Watson and Mary Herring.

A short business meeting was conducted by Ms. Watson, president. Roll call was

answered by members telling how they found out about Santa Claus.

Committee reports were given and home tour chairman Judy Williams reported a very successful tour. Members voted to make donations to the Chamber of Commerce Christmas lighting fund and to the Christmas Stocking Fund. They were then asked to volunteer to help at the lung association's booth in the mall.

Games were played with a gift exchange. The program ended with the group singing Christmas carols.

Other members present were Carolyn Baxter, Frances Berry, Ruth Black, Beverly Bryant, Janice Faulkner, Sarah Hazelrigg, Betty Lady, Gladys Merritt, Betty Owen.

Also, Nancy Priest, Lucy Rogers, Carrell Ann Simmons, Tricia Sims, Mysedia Smith, Georgia Sparks, Debbie Tardy, Betty Taylor, Pat Walsh and Mary Beth White.



Tooting For Tots

The 103-member Stanton Junior High Band presented a Christmas program to students at Bluebonnet Thursday morning. The Stanton and La Plata bands took turns playing popular Christmas tunes for all the elementary schools in Hereford. The programs also

served as recruiting sessions, with directors talking about the instrumental music program to the audience. Jim Summersgill directs the Stanton band while James MacLaskey is in charge of the La Plata musicians.

Vows exchanged

Nancy L. Walker of St. Louis, Mo., and Dennis Collins were united in marriage Saturday at Maplewood Methodist Church in Maplewood, Mo.

The bride is the daughter of Mr. and Mrs. Gordon Walker and the bridegroom is the son of Mr. and Mrs. Boyd Collins of Hereford.

She graduated from Maplewood High School and the University of Missouri in St. Louis, and is currently employed with the Clayton Finance Group as officer manager and accountant.

He is a 1977 graduate of Hereford High School and graduated from Washington University in St. Louis in 1981. He is presently studying for his master's in architecture at Washington University, with plans to finish in the spring of 1984.

Christmas clubs are wonderful. They pay off just in time to settle last yule's overdue bills.

Jones participates in conference

Lynn Jones, president of the Hereford Board of Realtors, participated the weekend of December 2-4 in Austin in a statewide conference to discuss the Texas Association of Realtors (TAR) 1984 program.

TAR's annual Board Officers Leadership Conference, which brings together the leaders of Boards of Realtors from

across Texas, was held to introduce the individual Board officers to a wide range of issues and topics that Realtors in Texas can expect to face during 1984.

The meeting program also included a number of presentations, workshops and seminars designed to enhance the board officers' leadership capabilities and the boards' levels of perfor-

mance during the upcoming year.

More than 200 representatives from 106 different boards of Realtors attended this year's conference, which was held at Austin's Hyatt Regency Hotel. The conference also included updates on legal and legislative issues expected to affect the real estate industry during 1984.

Q&A

1. What is the name of the New Zealand runner who won the 800-meter race in the 1960 and 1964 Olympics? (a) Peter Snell (b) Emil Zatopek (c) Paavo Nurmi
2. Who was the first U.S. ambassador to the Soviet Union? (a) Georges Danton (b) William C. Bullitt (c) Henry Cabot Lodge

ANSWERS

1. a b c 2. b c a

Christmas Fruit Baskets

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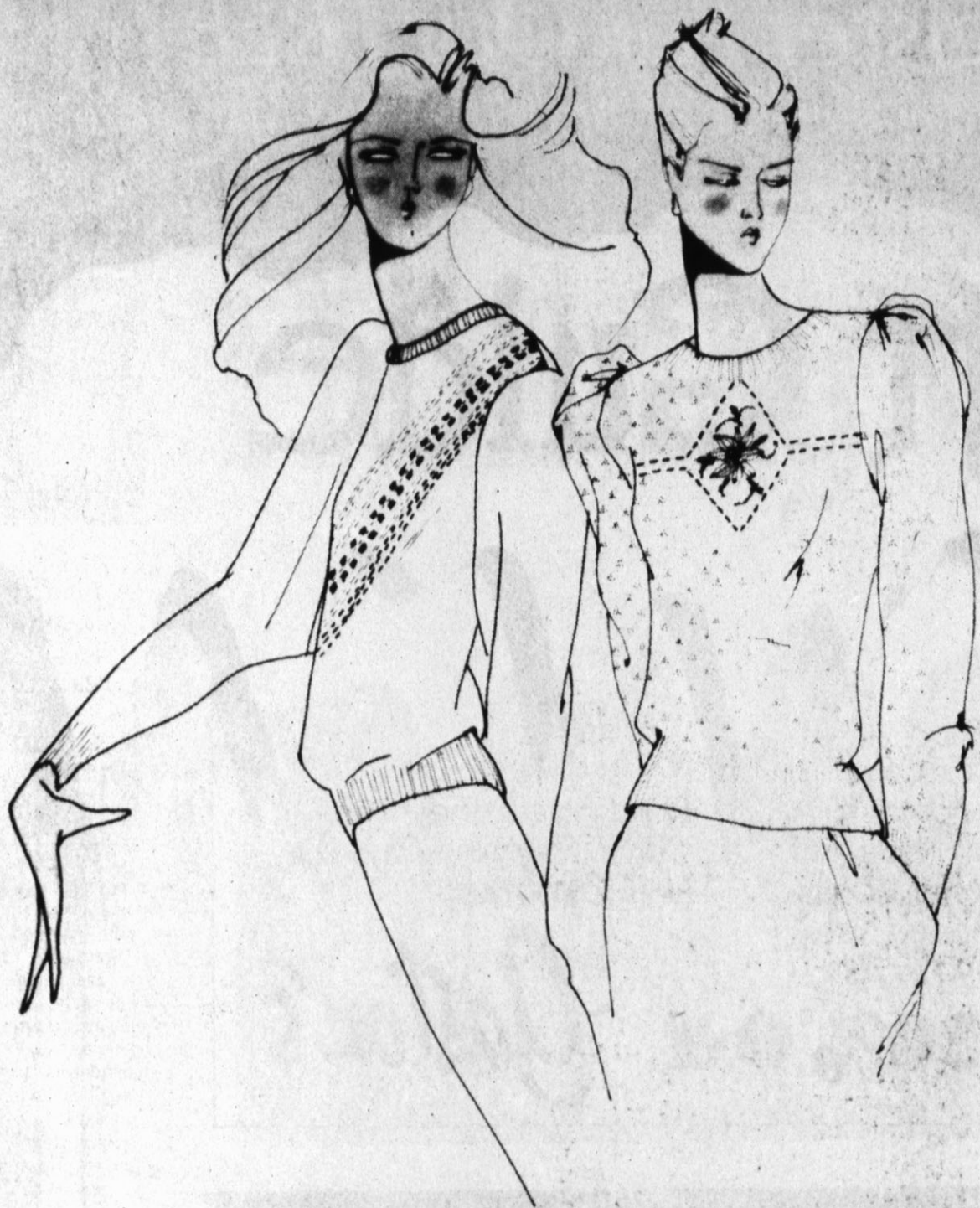
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Christmas... Just Around the Corner at
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Mariea Kim has knitted up a sophisticated and charming collection of tops for the spring season, concentrating on lightweight yarns and pale colors.

Opera, 'Exotic, irrational entertainment'

NEW YORK (AP) — The Metropolitan Opera is celebrating its 100th birthday this season. The great gold curtain was first raised on Gounod's "Faust" in the old yellow brick brewery on Broadway in the garment district in 1883.

But this most demanding of all the stage arts has never been to everyone's liking.

Opera, said Samuel Johnson, is "an exotic and irrational entertainment."

Opera, said Jimmy Durante, "is when the bum gets stabbed seven times and keeps on singing."

To William Morris, the poet-artist who invented the Morris chair, opera was "the most rococo and degraded of all art forms."

Sir Isaac Newton, according to a diary entry by the Rev. William Stukely in 1720, "said he never was at more than one opera. The first act he heard with pleasure, the second stretch'd his patience, at the third he ran away."

I must confess to being an unabashed lover of opera, French, German, Italian, even modern, anything as long as it doesn't concern the boring tales of Damon and Pythias or Orpheus and

Eurydice. I have long suspected, as have many critics, that half the audience has been impounded by reason of duty to culture, marital harmony or season tickets procured at a low ebb of sales resistance.

Perhaps what is needed in the Met's centenary year is a guide to modern music, like the short handy guide to opera that once appeared in the French magazine La Vie Parisienne. Here are a few excerpts:

"Beethoven: Mighty genius. Bow down in deepest homage. That's the way it is. How to act during performance? Deepest concentration. Everyone has to see that you are paying the closest attention. Solemn silence. Your deep emotion is betrayed only

by a hardly noticeable shaking head.

"Berlioz: Misunderstood during his lifetime. Since his death our ears have gotten used to worse things. Declare that he is extremely strong and awfully interesting. Strange. Strange. Strange. How to act during performance? Your glance should

be wild and half-demented. Your hands clenched, your throat dry. And put as much cotton in your ears as you can stuff into them.

The first traffic light in the U.S. was installed in Cleveland, Ohio, at the intersection of Euclid Ave. and E. 10th St., on August 5, 1914.

Off the Runway

Easy elegance marks spring '84 collections

By ANNE WINSTON
As promised, I've another breath or two of spring for you from the drawing boards of the designers. Easy and elegant are the two key words for the collections I'm reviewing today.

Easy, because designers believe that women must be comfortable and enjoy what they're wearing, without having to make a big fuss about getting dressed.

Elegant, because women want to project a polished image that shows the world they feel good about themselves.

Silk is one of Alistair McRobbie's favorite mediums when he designs the Pierre Cardin Sportif collection. This spring he's used it in "very simple, two-piece dressing. There'll be none of the tucking and ruffling we've been seeing. These are very simplified and very sophisticated," he said.

His colors are whitened and flattering to the skin, as in a stripe of face powder, celery and chalky rust or a combination of gray with periwinkle and dull gold. Prints are large, abstract florals spaced randomly over pale or white grounds.

Mariea Kim has knitted up a sophisticated and charming collection of tops for the spring season, concentrating on lightweight yarns and pale colors. The key to Kim's design is her unusual mixtures of yarns. Each piece has an individual look which

comes from the combinations of fibers and yarns which gives it character.

Her colors for spring are baby pastels surprisingly teamed with sophisticated pinks. Pink, blue and maize look new when combined with pale gray, soft taupe and subtle mauve.

In the new Anne Klein II collection, colors tend to be stronger and are used in bold shapes that appeal to the customer who wants to make a statement in dressing. Big and easy and authoritative, they are for the women who not only understands fashion, but also has confidence in her taste.

With black, white and gray as base colors, the collection consists of chalk brights in fabrics ranging from cotton interlock to wool gabardine from sweatshirting to silk.

Out in California, Gene Ewing takes the big shape and

layering to the new limits. Her loose, floating garments are imaginatively wrapped and tied with great squares and oblongs of fabric that give the impression of stylized art. (Just be sure, when

you buy an outfit, they you know how to do all that wrapping and tying). Gene's used a variety of fabrics, from dusty-toned crinkled cottons to pastel tie-dyes to primitive African prints.

New Owner

Gloria's (formerly Silverthread Alterations) is now under the ownership of Gloria Hubner. Gloria wishes to invite all of Rose Valdez' customers & friends to come by & take advantage of the same quality service at the same convenient location. Only the name has changed!

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\$21. Versatile boucle cardigan cover-up with deep patch pockets. Soft acrylic knit in a wide range of solid colors for giving. Misses' sizes S,M,L.

\$25. Decidedly feminine, satin striped georgette blouse. Endearred with ruffled collar and detachable bow. In beautiful colors, too. Misses' sizes 8 to 18.

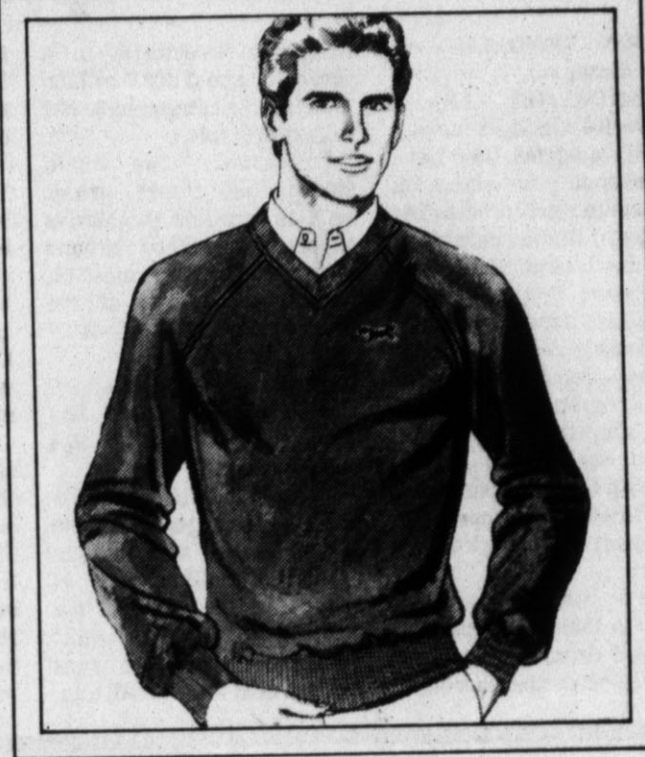


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\$18 ea.

\$18. Sweater collectors count on classic crewnecks in scads of colors. So add this soft Orlon® acrylic knit to her options. Misses' sizes S,M,L,XL.

\$18. For a poetic touch, our tender blouse with row upon row of ruffles and lace. She'll love it in winter white or black. Soft Ultrissa® polyester for misses' sizes 8 to 20.



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The hunt for his gift is over. Get the Fox™ v-neck pullover of plush cotton/polyester velour. Ribbed trim neck, cuffs and bottom. Terrific colors. Men's sizes.



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Give him the classic crewneck updated in a wool/Dacron® Hollofil® polyester blend. Layer over shirts or pair up with sportcoats. Men's sizes.



\$12 and \$14 Fanciful dreamwear for her.

\$14. She'll love this long gown of luxe nylon fancied with point d'esprit and embroidery on the bodice. Lovely colors for misses' sizes XS,S,M,L.

\$12. Sweeten her dreams with a nylon waltz gown. Prettied with delicate tracings of embroidery and point d'esprit. Romantic cap sleeves, too. Misses' sizes XS,S,M,L.

You can't go wrong; any of these gifts can be exchanged at any of our 1631 JCPenney Stores.



\$24 Cozy blanket robe

Wrap her in the head-to-toe comfort of this hooded Acrilan® acrylic robe. Zip front, large patch pockets. Assorted colors. Juniors' XS-L.



\$29 Long fleecy robe

Thick fleecy robe of acetate/polyester for over-all warmth. With zip front. Assorted colors. Misses' S,M,L.



Long brushed gowns

For sleeptime comfort. Warm gowns of soft brushed nylon in soft pastel shades. Misses' sizes

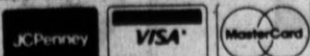
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Men's sportslacks

Sportslacks tailored of texturized polyester for freedom of movement. Detailed with stretch waistband and coordinating leather-tabbed belt. Men's waist sizes.



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Soviets buy more wheat: Agriculture Department

By DON KENDALL AP Farm Writer

WASHINGTON (AP) — The Soviet Union is among several countries that have been shopping for wheat on the world grain market recently, including purchases from the United States and Australia, says the Agriculture Department.

A monthly report Wednesday by the department's Foreign Agricultural Service noted also that China has assured the United States that it will live up to purchase commitments in a four-year grain pact covering wheat and corn.

Even so, world wheat production in 1983-84 is expected to exceed demand, meaning there will be another increase

in global inventories to a record of about 102.6 million metric tons, compared to 96.7 million last July 1.

Conversely, the world stockpile of "coarse" grains such as corn and sorghum is expected to decline to around 64.2 million tons by mid-1984, less than one-half of the record stockpile of 137.7 million tons this year.

A metric ton is about 2,205 pounds and is equal to 36.7 bushels of wheat or 39.4 bushels of corn.

In a related report earlier this week, the agency said the Soviet Union has bought around 20 million tons of grain for delivery in the 1983-84 international marketing year that runs through next June 30. All told,

the Soviets are expected to import about 29 million tons of grain, the smallest amount since 1978-79.

About 6.4 million tons of the Soviet purchases so far have been from the United States, including 3.6 million tons of corn and 2.8 million tons of wheat. Those are part of the corn and wheat the Soviet Union must buy annually under a new five-year agreement.

"Most of the world's grain sellers have participated," the report said. "Wheat has accounted for more than three-fourths of the recent trade. Soviet coarse grain buying has picked up some. However, it is still well behind the level of recent years, possibly reflecting

both this year's estimated large domestic supply and Soviet reluctance to cover needs at current high prices."

Australia reportedly has sold 1.5 million tons of wheat to the Soviet Union, with deliveries beginning on Jan. 1. Last year, the Soviets bought only 1 million tons from Australia's drought-reduced crop.

The Soviet Union's grain harvest continues to be estimated at 200 million tons, the biggest yield in five years.

One reason the Soviet Union is a major buyer of grain from the United States and other countries is to help maintain its growing livestock sector to provide meat, poultry and dairy products for Soviet consumers.

According to the report, livestock performance has continued to show strong gains this year on state and collective farms. As of Nov. 1, record inventories were reported for cattle, hogs and poultry.

Looking at 1984 grain prospects, the report said that "conditions for winter grains have improved and are better than a year ago" in the Soviet Union, and generally.

WASHINGTON (AP) — The Agriculture Department says cattle feedlot inventories continue to run below year-earlier levels.

As of Dec. 1, the number of cattle being fed in the seven major beef states totaled 7.81 million head, down 6 percent from a year ago but still 7 percent more than two years ago, the department said Wednesday.

Feedlot inventories were down in all states except Arizona, which reported an increase from a year ago.

Marketings of "fed" cattle in November were reported at 1.46 million head, down 2 percent from last year but 11 percent more than two years earlier.

The placement of new cattle and calves in feedlots last month dropped 4 percent from November 1982 but was up 5 percent from two years ago, the report said.

Higher feed costs and downward pressure on livestock prices have squeezed feedlot profits this year, contributing to the decline in inventories.

Feedlot cattle inventories as of Dec. 1 in the seven states — which account for about three-fourths of the nation's beef — and their percentages of a year earlier, included:

Arizona, 407,000 head on Dec. 1 and 109 percent of a year earlier; California, 597,000 and 95; Colorado, 980,000 and 94; Iowa, 950,000 and 86; Kansas, 1,290,000 and 95; Nebraska, 1,700,000 and 90; and Texas, 1,890,000 and 97.

WASHINGTON (AP) — A popular Agriculture Department credit program used to boost export sales of U.S. farm products will be held to \$4 billion this fiscal year, down from \$4.8 billion in 1982-83.

Richard A. Smith, administrator of the department's Foreign Agricultural Service, said Wednesday the \$4 billion, however, represents a \$1 billion in-

crease from what had been authorized for the year that began on Oct. 1.

A source who asked not to be identified said that White House budget officials had turned down a request by Agriculture Secretary John

R. Block that this year's fund be boosted "considerably above" what was approved.

The program provides loan guarantees to selected countries to help increase their purchases of U.S. agricultural commodities.

Accent on Agriculture

By DENNIS W. NEWTON, County Extension Agent



With the holiday season approaching, livestock producers need to be aware of the hazards of marketing animals during this time of the year.

Here are some factors that could affect the market. Many local livestock auction markets close over the holidays, so it pays to make a phone call before loading up any animals going to market. Also, most market news reports are also discontinued or skipped on certain days during the holiday period and price information may be hard to find.

Also, many ranchers, because of some holiday vacation time, will be spending extra time with their stock. Watch for some possible heavy movements of livestock to markets at times during the next few weeks.

Added to the problem is that both Christmas and New Year's Day are on Sunday this year and the official holiday are on Mondays. These

are normally heavy slaughter days so the supply impact of two Monday holidays may be quite substantial.

Kosher traditions also affect cattle demand. This is especially true when non-slaughtering, Kosher holidays fall close to Christmas holidays. Such conditions can easily cause several days of extremely low slaughter and, thus drastically affect the demand for cattle.

Price levels are also influenced by the holidays. In general, if prices for cattle are moving upward going into the holidays, a period of stability usually occurs until the new year arrives. If, however, prices are moving downward, further market weakness during the holidays is a certainty.

The demand for red meat is greatly influenced by holidays. Not too many consumers will be having a steak dinner on Christmas or New Years.

Use caution in your marketing decisions during the holiday season.

We would like to salute Don Hicks who was recognized Thursday for nine years of service on the County ASCS Committee. Hicks served as chairman of the ASCS committee and did an excellent job serving farmers of Deaf Smith County.

Donald Meyer was elected as county committee-man at the County ASCS Convention on Thursday. Meyer will replace Hicks.

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Western, plains farmers rush to conclude harvest

COLLEGE STATION, Texas (AP) — Texas cotton farmers in western areas and the plains are making a fast dash to the finish line as far as harvesting operations are concerned.

Cotton harvesting is virtually complete in the South Plains and West Central Texas. About 20 percent of the crop remains to be harvested in the Panhandle and Far West Texas while up to half of the crop still remains to be harvested in some Rolling Plains counties.

The South Plains cotton crop will tally about one million bales, one of the shortest on record, due to this year's PIK program and weather problems, said Dr. Zerle L. Carpenter, director of the Texas Agricultural Extension Service, Texas A&M University System. The cotton crop has also been short in most other areas of the state although some irrigated cotton produced excellent yields.

A good to excellent pecan harvest continues over much of Texas but growers are plagued by low prices, said Carpenter.

Harvest operations also remain active in the Winter Garden of Southwest Texas and in the Rio Grande Valley.

Fall and winter vegetables such as spinach, carrots, cabbage and lettuce continue to move to market in the Winter Garden. The sugarcane harvest remains active in the Valley along with harvesting of citrus and a smattering of vegetables. Shipments of gift citrus are increasing as the holiday season approaches, Carpenter noted.

Much of the western half of Texas as well as central areas need rain to boost small grains for livestock grazing. Small grains are doing well in parts of the plains and in eastern and coastal areas. Clovers and ryegrass also are making good growth in eastern sections.

Livestock feeding continues to increase in western and central sections due to limited grazing, Carpenter said.

Reports from district Extension directors showed these conditions:

PANHANDLE: Cotton harvesting is progressing rapidly, with about 80 percent of the crop in. Irrigated wheat looks good while the dryland crop needs rain. Greenbugs are becoming a problem in some wheat. Cattle are grazing some wheat and crop stubble and are in fair to good condition.

SOUTH PLAINS: The cotton harvest is virtually complete. This year's crop of one million bales was one of the shortest on record due to the government's PIK program and weather problems. Wheat is making good growth and offering some grazing. Cattle feeding is light.

ROLLING PLAINS: Cotton harvesting is moving rapidly with open weather; harvesting ranges from complete in some counties to only half complete in others. Dryland yields are poor but some irrigated yields are as high as 1-3-4 bale per acre. A few fields of small grains are still being planted, with early fields making excellent growth and providing grazing for livestock.

NORTH CENTRAL: Farmers are still harvesting a few peanuts; this year's crop was good. Most wheat and oats are making good growth, with early fields providing grazing for livestock.

NORTHEAST: Small grains and other winter pastures are making good growth and providing grazing for livestock. However, sup-

plemental feeding continues. Pecans continue to be harvested in most counties; this year's crop is fair to good.

FAR WEST: Cotton harvesting continues over the region, with more than 80 percent of the crop in. Yields and quality of the crop have been down this year due to the dry summer, pink bollworm problems and damp fall weather. Harvesting of a good pecan crop is about 65 percent complete. Livestock and range conditions are improved, with supplemental feeding active.

WEST CENTRAL: Cotton harvesting is virtually complete; yields were generally low. Small grain seeding is about complete, with rain needed to get the crops up and growing. Livestock conditions are generally good although some cases of Bluetongue have been reported in cattle in Coke County. Some ranchers are spraying cattle for ticks and lice. Lambing is under way and supplemental feeding of livestock is active. Harvesting of a bumper pecan crop continues.

CENTRAL: A good pecan harvest continues, but growers are plagued by low prices. Rain is needed over

the area to boost small grain crops. Stockmen are feeding a lot of hay to their herds due to poor grazing conditions.

EAST: Small grains, clovers and ryegrass are making good growth and providing grazing for livestock. Legume stands look good. Cattle are going into the winter season in good condition.

UPPER COAST: Wheat and oats are making good growth and are providing

grazing for livestock. Livestock are in excellent condition for this time of year. A few pecans remain to be harvested.

SOUTH CENTRAL: The wheat crop continues to make good progress although some areas need rain. Some farmers have replanted fields where wheat stands were poor due to earlier dry conditions. Stocker cattle operators are buying calves as grazing conditions im-

prove on small grains. A good pecan harvest is past the halfway mark.

SOUTHWEST: Small grains as well as native ranges need rain for continued growth. Livestock are in good condition, with some supplemental feeding. Harvesting of spinach, carrots, cabbage and lettuce continues. A good to excellent pecan harvest is about complete.

COASTAL BEND: Farmers are busy getting cropland in shape for next spring and are applying her-

bicides and fertilizer. Most small grains as well as pastures need rain. Livestock conditions remain good. This year's pecan harvest is virtually complete; yields have been good.

SOUTH: The sugarcane harvest continues to produce good yields. Citrus harvesting is active, with the market good for gift fruit as the holiday season approaches. Harvesting of peppers and other fall and winter vegetables continues. Livestock and range conditions are good.

Safety encouraged for those hunting

COLLEGE STATION — Firearms are deadly weapons, deadly enough to kill 19 Texas hunters in 1981 and 23 in 1982.

Texas hunting accidents also result in up to 100 non-fatal disabling injuries each year.

"With increased fall and winter hunting activities at hand, it's appropriate to recall the basic rules of hunter safety," said Dr. Gary S. Nelson, safety engineer with the Texas Agricultural Extension Service, Texas A&M University System.

Dr. Nelson pointed out that although basic hunter safety rules may seem elementary and a matter of common sense, the occasional violation of these simple rules by otherwise safe hunters results in both fatalities and injuries.

He listed these basic firearm safety rules:

1. Treat every gun with the respect due a loaded gun, even if you "know" it's not loaded.
2. Guns carried into a camp or home, or put into automobiles, must always be unloaded.
3. Always be sure that the barrel and action are clear of obstructions before loading.
4. Always carry your gun so that you can control the direction of the muzzle, even if you stumble. Keep the "safety" on until you are ready to shoot.
5. Always be sure of your target and your background before putting your finger on the trigger.
6. Never point a gun at anything you do not intend to shoot.

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Agriculture Briefs

Year-End Tax Strategies For Farmers

Farmers and ranchers have only a few weeks left to review their income tax situations and to consider certain strategies for reducing tax dollars. In many cases, 1983 income taxes will be affected significantly by the government's PIK (payment-in-kind) program and severe drought conditions, notes an economist with the Texas Agricultural Extension Service, Texas A&M University System. A general recommendation for tax planning is to try to level out taxable income from year to year to avoid jumping through several tax brackets from one year to the next. 1983 tax tables reflect a 10 percent reduction from the 1982 tax rate while the tax rate will be reduced another 5 percent in 1984.

Get a Texas-Grown Christmas Tree

Shoppers will find more Texas-grown Christmas trees this year, says a forester with the Texas Agricultural Extension Service, Texas A&M University System. Several hundred thousand trees, grown mainly in eastern counties, should be available in retail lots and on a "choose-and-cut" basis. Sales of these trees should total about \$3 million to growers. Texas-grown Christmas trees, mostly Virginia pines, offer a number of advantages over trees shipped in from northern states. They are fresher, more fragrant and usually less expensive.

Peanut Growers Suffering

Texas peanut growers are enjoying a good price for their crop this year, but small-scale

farmers are facing a dim outlook because of the government's quota system. Many peanut farming operations are no longer economical because of small quotas, says an economist with the Texas Agricultural Extension Service, Texas A&M University System. Farmers are getting good prices for both quota and additional peanuts this year due to tight supplies. However, once supplies improve and prices come down, small farming operations will be hard-pressed to continue to grow peanuts because of quota limitations and a low support price.

Texas Stocker Calf Trade Show

The first ever Texas Stocker Calf Trade Show will be held Jan. 5 at the National Guard Armory just east of Marlin on Farm Road 147. Registration will be from 1:30 to 3 p.m. Show highlights will be 13 mini-seminars sponsored by allied animal agriculture industries plus two keynote speakers at a 7 p.m. program. They are Dr. Rod A. Bowling, vice president for research and development with Monfort of Colorado, Inc., and Dr. Gary C. Smith, head of the Department of Animal Science at Texas A&M University.

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WE HAVE REPORTED on a new book from Kansas State University dealing with super thick sorghum management. According to the K-State experts, when deciding on row spacing, the sorghum producer should use drilled sorghum if he can get enough through the residue and if lodging is not a problem, or if the hybrid has a good history of standability. Drilling is also a consideration if the producer is looking for maximum grazing following harvest, and if planting will take place three to six weeks after conventional sorghum. A year's experience with super thick varieties is also helpful before drilling. Wide row sorghum should be utilized if heavy residue is a problem which leads to plugging, if the field lodges or you intend to use pickup attachments on the combine.

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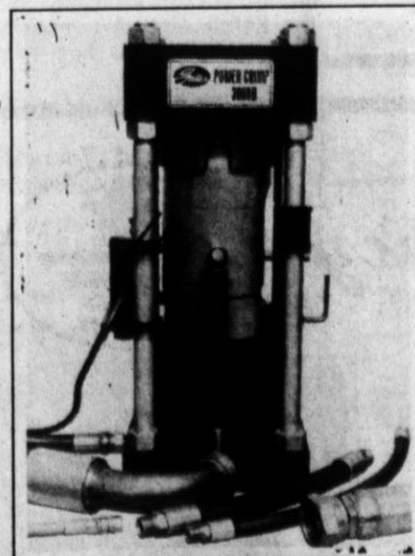
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Farmers need to have tax strategies

COLLEGE STATION — With 1983 winding down, farmers and ranchers need to look at their income tax situations and to consider certain strategies for reducing tax dollars.

"In a year which brought the government's PIK (payment-in-kind) program and severe drought conditions in some areas, farmers and ranchers have much to

ponder from an income tax viewpoint," according to Dr. James Ahrenholz, economist with the Texas Agricultural Extension Service, Texas A&M University System.

"A general recommendation for tax planning is to try to level out taxable income from year to year to avoid jumping through several tax brackets from one year to the next," Dr. Ahrenholz said.

"Leveling your income from year to year will almost always save tax dollars over the long run."

For finding out where one stands on 1983 taxable income, tax tables and schedules reflect a 10 percent reduction from the 1982 tax rate. Subtract investment credits and other credits after making the calculations. For planning purposes,

1984 tax rates will be only 5 percent less than '83 rates.

Producers who took part in PIK must decide when to receive their entitlements, if they have not already done so. Those who have received their entitlements may have to report them as 1983 income even though they do not plan to sell their commodities until after the first of next year. It all depends on whether the PIK a producer receives is

from his own loan or reserve commodity and whether he has assigned his PIK entitlement to someone else, Dr. Ahrenholz explained.

Many PIK participants are facing prospects of higher than usual income and lower than usual expenses. Producers in this situation can take certain steps to reduce their 1983 tax burden: delay additional sales of commodities until 1984 or sell now and take payment next year on a deferred payment contract, and buy supplies ahead before the end of the year.

In addition, income averaging might be a means for lowering the 1983 tax burden, especially if income this year is considerably higher than the past few years.

"Producers should also realize that crop insurance proceeds need not be included in income until 1984 if the lost crop would normally have been sold then," Dr. Ahrenholz pointed out. "This also holds true for profits from forced livestock sales (except breeding and dairy animals) if in an area designated eligible for federal assistance. Proceeds from forced sales of breeding and dairy animals due to drought are not counted as income if they are reinvested in like animals within a two-year period."

Some farmers who received advance deficiency payments on crops in the acreage reduction program will have to repay those before the end of the year or they will count as income, Dr. Ahrenholz noted.

A farmer can also reduce his 1983 taxable income by contributing to an Individual Retirement Account or Keogh plan.

"To increase deductible expenses for 1983, a cash basis producer might buy supplies for next year's needs and buy capital items that qualify for a full year's depreciation and investment credit," Dr. Ahrenholz said.

However, if a producer is faced with a low profit or loss situation, he needs to take measures to boost income just to take advantage of personal exemptions and deductions. A single taxpayer under 65 with no dependents pays no tax on the first \$3,300 of income while a married couple with two dependent children can earn up to \$7,400 without owing tax.

"The best way to boost income before the year's end is

to sell crops and livestock, even if delivery is delayed into 1984," Dr. Ahrenholz pointed out. "Keeping advance diversion payments, taking PIK entitlements and selling machinery that has been depreciated out can all generate immediate income."

To keep expenses down, defer payments until after the first of next year if possible. Buy on an installment contract where practical. Also, shifting assets bought

before 1981 from a rapid method of depreciation to the straight line method will reduce deductions.

The "Farmer's Tax Guide" from the IRS is the best reference for farmers and ranchers who may want to check on tax points relating to their particular situations.

Dr. Ahrenholz also advised producers to check with their tax advisors or consultants now for further information on year-end tax planning strategies.

Using new method

Potential antitumor drug made

By Robert L. Haney
TAES Science Writer

Human beta interferon—known in the medical profession to have anti-tumor, antiviral, and antiproliferative properties—is being produced in unusually large amounts by insect cells in the laboratory, through a new method developed by scientists at Texas A&M University.

Investigators in the Department of Entomology, Drs. Max D. Summers and Gale E. Smith, recently reported on the development of a baculovirus expression vector that can be used for the production of medically important products from cloned genes.

One potential use of the human beta interferon, manufactured by such a method, would be in treatment of cancer. Thanks to the cloned gene, genetically redesigned by the TAES scientists, the virus has been reprogrammed to produce interferon in the insect cells and in far more copious quantities than do human cells.

Other scientists have produced interferon in animal cells and yeast, but in far lesser amounts; interferon inhibits the replication of vertebrate viruses in vertebrate cells and therefore inhibits the production of interferon. The replication of baculoviruses is not inhibited by interferon.

The insect cells found to work best were from the ovaries of the fall armyworm. The interferon has only been produced experimentally in the university laboratory, Summers cautions, and has not yet been used on human patients. Such testing will come next while plans and methods are developed for its commercial production by industry.

For those of you who need the details of this scientific achievement, Summers explained, "Using recombinant DNA techniques, the sequen-

ces for human beta interferon were cloned into bacterial plasmids, and linked to the promoter from a baculovirus gene called polyhedrin. The promoter is that part which turns on or off and regulates the expression of a gene.

"Polyhedrin is a protein produced by baculoviruses and is probably the most highly expressed animal virus protein known. The coding sequences for interferon were directly linked to the polyhedrin promoter to construct a hybrid gene consisting of a baculovirus polyhedrin promoter-interferon gene coding sequences.

"The hybrid gene was transferred to the infectious baculovirus DNA of *Autographa californica* by substituting the hybrid gene for the natural polyhedrin gene, thus producing a recombinant baculovirus.

"In cells infected with recombinant virus, biologically active interferon was produced at unusually high levels, some of the interferon is glycosylated, and more than 95% of the interferon was secreted into the culture medium.

"Baculoviruses are insect pathogenic viruses with large circular DNA genomes," Summers said. "The host range for the virus used in this study is limited to a few species of Lepidopteran insects

and cultured insect cells. "Historically, the most attention for these viruses has been given for their development in agriculture as viral pesticides for insect pests affecting agricultural crops and human health.

"As mentioned earlier, human beta interferon is known to have antiviral, antiproliferative, and anti-tumor properties, and should prove important in a variety of medical applications. The B-interferon gene has been expressed in *Escherichia coli* cells by fusing interferon protein-coding sequences to a bacterial promoter on plasmids or lambda phage vectors.

"The interferon has also been produced by recombinant DNA in non-human cells (bacteria and yeast) under the control of its own or other genetic regulatory signals.

"An average of 5 x 10⁶ units of interferon per ml of insect-cell-culture medium was obtained after infection of insect cells with the recombinant *Autographa californica* baculovirus containing the insect baculovirus-interferon hybrid gene.

"This is the highest level of expression reported for B-interferon, using any eucaryotic expression vector and as high as the best that has been reported for prokaryotic vector systems.

"Furthermore, preliminary data suggests that the interferon protein is glycosylated and that during secretion, the signal peptide was removed, thus showing that post-translational processing of this foreign gene product occurs in insect cells.

"The development of efficient cloning and expression vector-host systems is a highly competitive area in vertebrate virology and recombinant DNA research.

"As a result of the preliminary research by the Texas A&M and Agricultural Experiment Station scientists, modified baculovirus genomes or selected baculovirus genes such as the polyhedrin gene, show exceptional promise as new vectors for the cloning and expression of foreign DNA sequences in cultured insect cells.

"This is because certain baculoviruses replicate efficiently in insect cells and contain certain non-essential genes that are highly expressed, such as the polyhedrin gene.

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McCaulley in Fisher County

Town foots its school bill

By SARALEE TIEDE Fort Worth Star-Telegram
 McCaulley, Texas (AP) — The bread truck doesn't come to McCaulley any more.

So the women who work in the cafeteria at the McCaulley school come in at 6 a.m. to bake bread for the children.

That is only part of the price that the people of this tiny Fisher County settlement are willing to pay for their own school.

So determined were they that the school would keep operating that five years ago they built houses on school property to attract new families to town.

There are 120 children enrolled in the McCaulley Independent School District. It has survived three attempts to consolidate with larger school districts and a 1978 bus crash that killed five football players, injured 19 high school students and put both the superintendent and principal in the hospital.

Texas has 474 school districts that have enrollments of fewer than 500 children. There are 980 districts with fewer than 1,500 children, the number considered necessary in 1968 to offer "a reasonably comprehensive program."

Experts in education agree that not many of the little schools can offer the high school curriculum necessary to prepare students for a technological age. Increasingly, administrators of small schools say their districts are faced with financial problems and difficulties in recruiting teachers.

All five of the unaccredited school districts in Texas have an enrollment of fewer than 15 students.

But despite incentives to consolidate — two districts that join can continue getting the state aid that once went to both — Texas has been unwilling to give up its community schools.

"The school is the community in many places," said State Education Commissioner Raymon Bynum. "These little towns have already lost their stores. The churches and the schools are all that's left. It's the community's identity."

Five years ago, after the bus crash decimated its student body, McCaulley — an

unincorporated town with one grocery store, two churches and a post office in the cotton fields north of Abilene — was at a crisis point.

Its enrollment teetered below 90, the break-point for state aid. School districts that have fewer than 90 children qualify for only seven paid teachers while those with more than 90 students get state money for 12 teachers.

"There was never any thought about closing the school," said the school board president, Marion Reed. "We care for our community, and we care for each other too much. We realized if the school ever closed it would make a tremendous difference in the community. The school activities are what draw people together."

The school board tackled the population problem head-on. Townspeople donated labor and materials so eight houses could be built or moved to school property. The houses attracted new families with school-age children.

Recently, the district bought 22 acres, part of which it will sell in lots to prospective homebuilders. Enrollment stabilized at about 100, but there still are limits to the educational program that McCaulley can provide.

In the elementary school, two grades share a classroom and a teacher, a situation that principal Byron Shelley says he would remedy if the money were there.

No foreign languages are offered, even though the University of Texas will require a foreign language for admission starting next year.

Not until 1981 did the high school start offering geometry, physics and business math. Only last year were high school students able to start taking consumer math and speech.

McCaulley's current mathematics teacher is teaching on an emergency certificate because he has only 12 hours of college mathematics instead of the required 24.

Last year, McCaulley had no librarian, and Kathleen Hale, a librarian who spends two days a week in the district this year, says it will take years of buying more books before the library is adequate.

good in the third grade — all the students passed last year — but not so good in the ninth — four of the nine students failed math and reading.

But the people of McCaulley says these shortcomings are minor compared with the advantages of a small, close-knit school.

"We know the kids, their parents and their grandparents," said Superintendent J.D. Hargrove. "Our teachers are very stable; we don't have much turnover, and they can offer one-on-one instruction. They get to know the students better."

Only one teen-ager is taking physics this year, and he has an hour each day with the science teacher.

Hargrove's wife, who teaches third and fourth grades, has 13 children in her combined classroom, allowing her to give special attention to each child.

"No student is neglected, or I would take it personally," she said. "When I taught at junior high at Stafford, I had 150 students a day. There was no way I could help each student. The slow ones had to be ignored, and I didn't have the opportunity to challenge the bright ones."

A small school means that everyone does double duty. The principal teaches Texas history, driver education and sometimes drives the school bus. The high school English teacher coaches football and track. The science teacher also is basketball coach and bus driver.

It also means that students get to participate in almost everything. Twenty of the 24 boys in high school play football.

Paul Benavides is an offensive end on the football team, senior class president, yearbook editor and an actor in the one-act play. He also plays basketball, runs track and participates in Future Farmers of America.

"In a smaller school you have a lot more chance to do things," he said. "If you want to do something you can."

McCaulley may be short on population. It is not short on wealth, thanks to the surrounding oil patch that gives it more than twice the average

wealth of Texas school districts.

Other small districts aren't so lucky.

"There are close to 300 districts in severe financial difficulty," said Joe Seale, executive director of the Texas Association of Community Schools. "The state Legislature in the last few sessions made tax exemptions for livestock, farm machinery, senior citizens and farm values that meant a lot of ad valorem taxes for small school districts."

"Many have no industry and many have very little growth," he said.

In addition, small schools are plagued with a shortage of math, science and foreign language teachers.

"There aren't enough of those teachers anyway, and many young people prefer to live in large urban areas," Seale said. "The pay is better, they can find better living quarters, shopping is better. They fear they will be isolated in small towns."

The crunch may come when new curriculum requirements and tougher college entrance requirements go into effect next year.



Winter Wonderland

Hereford received its first visible winter weather Thursday during a 2-and-a-half-inch snowfall. Most areas of Deaf Smith County reported having received similar amounts.

'Messiah' popular show

By HUGH A. MULLIGAN AP Special Correspondent

RIDGEFIELD, Conn. (AP) — In towns and cities around here — Danbury, Newtown, New Haven, Hartford — and in churches, concert halls and opera houses around the world, choirs and orchestras of every size are tuning up to assault the season with Handel's "Messiah."

Arguably — to use that modern buzz-off word properly — the "Messiah" is the greatest piece of music ever written. And certainly the most democratic. Anyone with even a tin ear sufficiently tuned to tell a bugle from a tuba can get into the act somewhere, especially at this forgiving time of year.

George Frederick Handel, a poor barber's son who ran away from law school to play the organ, was always known as a "noisy composer," forever doubling the number of voices in his chorus and wanting thrice as many instrumentalists. He himself began the come one, come all "Messiah" tradition, when as a governor of the Foundling Hospital he gave an annual fund-raising performance of his masterpiece and invited the children to sing along.

His "Messiah" lifted his own life and career from the depths of despair, as it has raised the spirits of countless millions ever since. Born in Halle in Saxony in 1685, Handel gained distinction as an organist and violinist with the Hamburg Opera, but his real love was composing. In 1710, the Elector George of Hanover appointed him court musician. Handel begged a leave of absence, his second, to further his studies in London then failed to return, only to have his irate master come to England as George I when Queen Anne died in 1714. The

truant regained royal favor with the help of his "Water Music" and his skill at Italian opera, of which he wrote 40. His anthem for the ascent of George II is still used in the coronation service. Handel became a British citizen in 1726 and made his home in England for the rest of his life.

But John Gay's "The Beggar's Opera" greatly diminished the vogue for Italian opera in London, and by the summer of 1741 Handel was bankrupt, seriously debilitated by a stroke and broken in spirit. He virtually imprisoned himself for 22 days in his flat at what is now 25 Brook St., seldom eating or sleeping, and emerged with the "Messiah" clutched in his paralyzed left hand. "I did think I saw all the Heavens before me, and the great God himself," he described his moment of inspiration for the

incomparable Hallelujah chorus.

The first performance was given in Dublin at the Musick Hall in Fishamble Street in aid of the "Society for Relieving Prisoners, the Charitable Infirmary and Mercer's Hospital." London first saw the "Messiah" on March 23, 1743, at the Theatre-Royal in Covent Garden.

Stunned and profoundly moved by the Hallelujah chorus, King George II rose to his feet and remained standing to the end. The audience followed his example, establishing a custom still observed in many concert halls and churches. On the 25th anniversary of Handel's death, his "Messiah" was performed in Westminster Abbey with 40 choir boys, 20 sopranos, 50 male altos, over 80 tenors and 90 basses and a 250-piece orchestra augmented by three enormous drums.

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Dear Santa,
I am a second grader at Tierra Blanca. I have been a good girl. I would like Baby Skates, poochie, daisy for Christmas. Merry Christmas to you!

Love
Melinda Casias

Dear Santa,
I am a second grader at Tierra Blanca. I have been a good boy. I would like Atari Martsers of the for Christmas Merry Christmas to you!

Love
Chris Montez

Dear Santa,
I am a second grader at Tierra Blanca. I have been a good boy. I would like a 200 Voices car from Knight, Dukes of Hazzard car, Boss Hogg car for Christmas. Merry Christmas to you!

Love
Johnny Z.

Dear Santa,
I am a second grader at Tierra Blanca. I have been a good girl. I would like babys skates for Christmas. Merry Christmas to you!

Love
Hope Fuentes

Dear Santa,
I am a second grader at Tierra Blanca. I have been a good girl. I would like baby skates and Poochie for Christmas. Merry Christmas to you!

Love
Mayra

Dear Santa,
I am a second grader at Tierra Blanca. I have been a good girl. I would like baby skates, Poochie for Christmas. Merry Christmas to you!

Love
Esmeralda Guerra

Dear Santa,
I am a second grader at Tierra Blanca. I have been a good boy. I would like video games for Christmas. Merry Christmas to you!

Love
Paul Gaitan

Dear Santa,
I am a second grader at Tierra Blanca. I have been a good boy. I would like Michael Knight for Christmas. Merry Christmas to you!

Love
Michael

Dear Santa,
I am a second grader at Tierra Blanca. I have been a good girl. I would like Poochie, baby skates, and Atari for Christmas. Merry Christmas to you!

Love
Michelle Garza

Dear Santa,
I am a second grader at Tierra Blanca. I have been a good boy. I would like video games for Christmas. Merry Christmas to you!

Love
Joel

Dear Santa,
I am a second grader at Tierra Blanca. I have been a good boy. I would like Atari and Race track and Michael Knight for Christmas. Merry Christmas to you.

Love
Elijio Garcia

Dear Santa,
I am a second grader at Tierra Blanca. I have been a good girl. I would like Strawberry Shortcake for Christmas. Merry Christmas to you!

Love
Estelab

Dear Santa,
I am a second grader at Tierra Blanca. I have been a good girl. I would like Poochie, Barbie doll and Pac-Man house for Christmas. Merry Christmas to you!

Love
Mary Murillo

Dear Santa,
I am a second grader at Tierra Blanca. I have been a good girl. I would like Barbie doll and house for Christmas. Merry Christmas to you!

Love
Herlinda Salinas

Dear Santa,
I am a second grader at Tierra Blanca. I have been a good boy. I would like a bike for Christmas. Merry Christmas to you!

good boy. I would like a bike for Christmas. Merry Christmas to you!

Love
Jesse

Dear Santa,
I am a second grader at Tierra Blanca. I have been a good boy. I would like Michael Knight, E.T. for Christmas. Merry Christmas. Love Daniel

Love
Daniel

Dear Santa Claus,
I am in second grade at Tierra Blanca. I have been a good girl. I would like a Barbie House and a care Bear Book Baby That Away, and skates. I love you Santa Claus.

Misty Ann Galvan

Dear Santa Claus,
I am in second grade at Tierra Blanca. I have been a good boy. I would like motorcycle and He-man. Have a Merry Christmas.

Love
Rosendo Alvarez

Dear Santa Claus,
I am in second grade at Tierra Blanca. I have been a good girl. I would like a puppy and Barbie House.

Tierra Blanca. I have been a good girl. I would like a Barbie House and bike. Have a Merry Christmas.

Love
Oralia Zallar

Dear Santa Claus,
I am in second grade at Tierra Blanca. I have been a good girl. I would like a baby skates and watch.

Have a Merry Christmas.
Love
Rachel Martinez

Dear Santa Claus,
I am in second grade at Tierra Blanca. I have been a good girl. I would like skates, Barbie book bike.

Have a Merry Christmas.
Love
Candy Cerda

Dear Santa Claus,
I am in second grade at Tierra Blanca. I have been a good boy. I would like a motorcycle and He-man. Have a Merry Christmas.

Love
Adolfo Cadana

Dear Santa Claus,
I am in second grade at Tierra Blanca. I have been a good girl. I would like a puppy and Barbie House.

Have a Merry Christmas.
Love
Sharon Saucedo

Dear Santa Claus,
I am in second grade at Tierra Blanca. I have been a good girl. I would like skates, baby skates and dolls.

Have a Merry Christmas.
Love
Thelma Barron

Dear Santa Claus,
I am in second grade at Tierra Blanca. I have been a good girl. I would like a baby skates and a game.

Have a Merry Christmas.
Love
Nora Mata

Dear Santa Claus,
I am in second grade at Tierra Blanca. I have been a good boy. I would like a motorcycle and Game.

Have a Merry Christmas.
Love
Chris Gonzales

Dear Santa Claus,
I am in second grade at Tierra Blanca. I have been a good boy. I would like a bike and book. Have a Merry Christmas.

Love
Hector Garcia

Dear Santa,
I am in second grade at Tierra Blanca. I have been a good girl. I would like a baby skates and a game.

good boy. I would like a He-man and Atari. Have a Merry Christmas.

Love
Mike Madrigal

Dear Santa Claus,
I am in second grade at Tierra Blanca. I have been a good girl. I would like a baby skates and watch.

Have a Merry Christmas.
Love
Rosemary Rodriguez

Dear Santa Claus,
I am in second grade at Tierra Blanca. I had been a good girl. I would like a skates and a baby skates.

Have a Merry Christmas.
Love
Elizabeth Medrano

Dear Santa Claus,
I am in second grade at Tierra Blanca. I have been a good girl. I would like a baby skates and Barbie House.

Have a Merry Christmas.
Love
Evon Trevino

Dear Santa Claus,
I am in second grade at Tierra Blanca. I have been a good girl. I would like a doll.

Have a Merry Christmas.
Love
Leticia Barrientos

Dear Santa,
Can you bring me an ewoh village please. I know you are a wonderful person. I love you Santa.

Thank you
From
Gabriel Guerreo

Dear Santa Claus, Mrs. Claus and all the Reindeer
I want you to have a Merry Christmas. I want the reindeer to have a real good flying space in the sky.

I kinda like the Care Bear Play Set. Would you see if you

have any extras? You might like to give it to me.

Love
Andrew Carr

Dear Santa,
I have been a good girl. Please think of the other boys & girls too. Please bring me: Make-up, comb, purse, new baby doll, taperecorder. We'll leave you an apple and milk.

Love you
Kesha Kimball

Dear Santa;
I have tried very hard to be good. I would like you to bring me a ten-speed, head set, 1 or 2 poochies, piano lamp, 1 or 2 tapes (blank), purse & dressy belt.

I wish you merry Christmas.

Love
Christine Kimball

Dear Santa,
All I want for Christmas this year is a baby doll and my brother Tim wants a clock radio. We have been

'kinda' good most of the time. We will be at our grandmother's and granddad's house Christmas Eve again this year.

Thank you
Your Friend
Candi Pankey

Dear Santa,
I would like to have a baby carriage, and a watch, some new clothes, also a

Strawberry Shortcake Doll (Angel Cake), and a radio headset, some new books, and a take-a-long cassette player, and a microphone. I have tried to be a good girl, Santa. Hope you will have a good trip. Please bring my brother Travis a Jam Box. He's been pretty good. Thanks alot Santa.

God Bless You!
Jenny Jones

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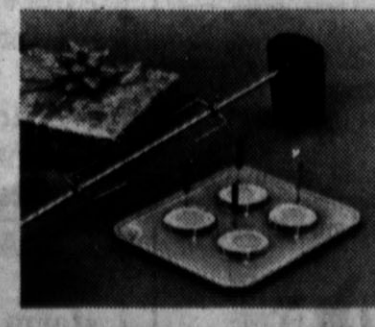
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Executive wants hope journalism

By MIKE FEINSILBER
Associated Press Writer
WASHINGTON (AP) — Allen H. Neuharth, the chairman of the Gannett Co., says newspapers that leave their readers feeling "the world is going to hell in a handbasket" may be headed there themselves.

Neuharth, whose company publishes 85 daily newspapers and owns radio and television stations, urged Gannett executives last week to abandon "the old journalism of despair" in favor of "the new journalism of hope."

The journalism of despair, he said, "leaves readers with a consistent, pervasive sense of discouragement, with a helpless feeling that the world is going to hell in a handbasket and no one can or will do anything about it."

But the journalism of hope "chronicles the good and the bad, leaves readers fully informed with a sense of balance about the world around them and with a feeling that they understand the issues of the day and can deal with tomorrow."

As an example of the kind of "smart-aleck, self-indulgent journalism" that he deplores, Neuharth cited a column by Bill Reel of the New York Daily News. Reel wrote that a "boring" news story would be one reporting that crime, fires and welfare fraud are down, reading scores are up, streets are cleaner.

Such a story would elicit "a derisive disbelieving snort" from New Yorkers, Reel wrote, and added: "A good

newsman can find a depressing angle to any story."

Said Neuharth: "Significantly, newspaper readership in Bill Reel's New York City has dropped since World War II from 5,260,000 to 3,409,000 and the number of daily newspapers has shrunk from 10 to three. Millions more readers have deserted this smart-aleck, self-indulgent journalism with the demise of metropolitan newspapers in cities like Boston, Chicago, Cleveland, Detroit, Los Angeles, Philadelphia, Washington and others."

Reel's editor, Earl King, op-ed page editor of the Daily News, said he thought Reel was only portraying the realities of life in New York City.

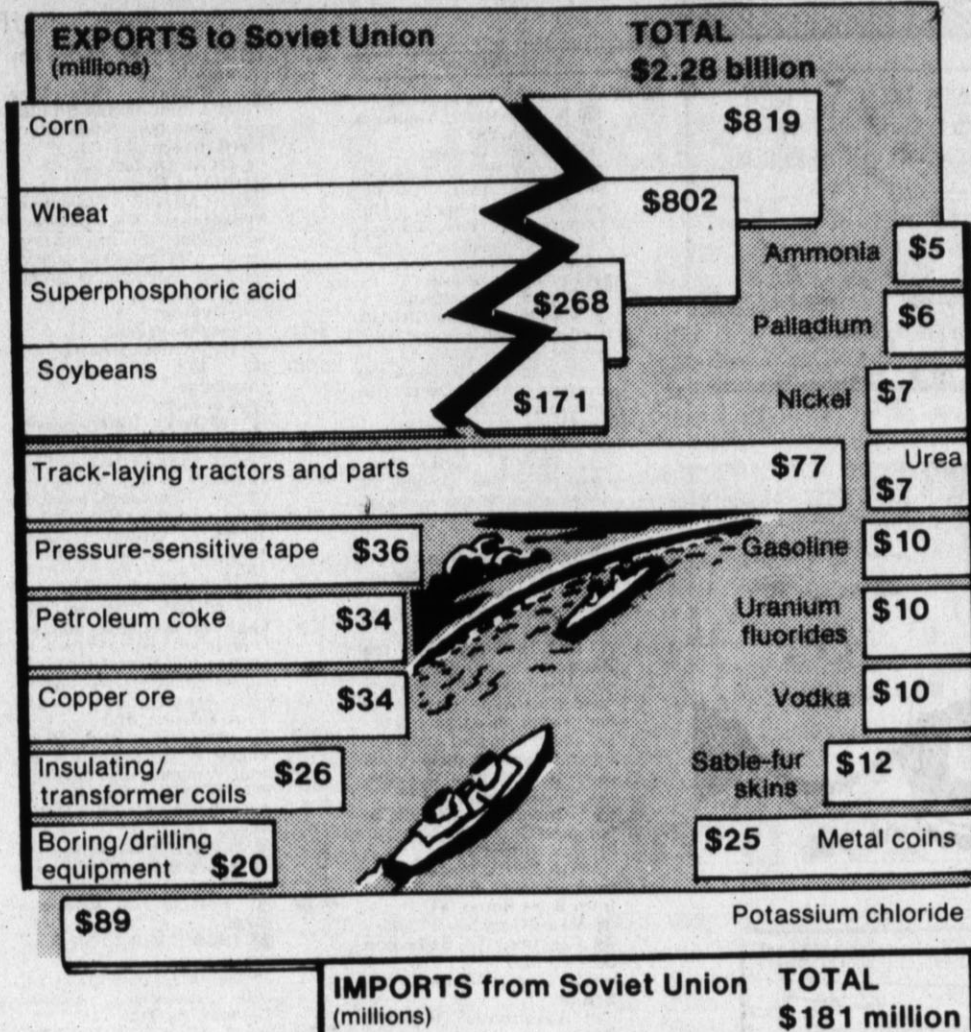
"If we wrote a headline that said everything was all right in New York City, people would laugh at it," King said. "But Mr. Neuharth is certainly entitled to his interpretation."

He said Reel, a columnist for 10 years, has been associated with some of the most constructive projects to improve life for New York's poor.

In his speech, Neuharth said total newspaper circulation is growing — having passed 60 million — because "across middle America the journalism of hope is more than making up for the journalism of despair."

"Those who recognize that the real news is all of the news — good and bad, glad and sad and otherwise, are not only going to survive, but thrive," he said.

U.S.-SOVIET TRADE It's far from balanced



(Source: U.S. Department of Commerce) NEA/Moffitt Cecil

U.S.-Soviet trade is one-sided. In dollar terms, the United States sells the Soviets more than 12 times what it buys from them. Grain accounts for nearly 80 percent of Soviet purchases.

With troubles

Woman helps teenagers

By DIANA HILL The Lufkin Daily News
LUFKIN, Texas (AP) — Teen-agers who are in trouble with the law or who have family problems seem to drift toward Gerry Simoneaux.

It's not unusual for the East Texas woman to wake up and find several teen-age kids — not her own — sleeping on her living room couch or on the floor.

"My heart goes out to these kids who have no place to go, no place to sleep and no money," Mrs. Simoneaux said. "I can't do much for them on my salary except give them a few hot meals, a

place to sleep and a friend to talk to.

"I really care what happens to them. I love kids, especially teen-agers. They seem to be seeking adult friendship — someone they can trust."

When her 18-year-old son, David, was arrested for stealing from a local store this summer, Mrs. Simoneaux decided to organize interested parents and teenagers for the purpose of helping troubled youngsters. Thus, Teens-N-Trouble was born.

"I asked the kids why, why, why do they do things to get in trouble?" Mrs. Simoneaux questioned her son and his friends. "Their responses varied from boredom to bad home environment to poor peer influence. Most of them can't get jobs, so they don't have money, so they end up stealing what they want."

TNT meets at 8 p.m. each Monday.

"The name of the organization is a play on words — teens 'and' trouble and teens 'in' trouble," she explained. "Some of our kids haven't been in trouble with the law; they just want to help other teens and to make Lufkin better for everybody."

During the meeting, which is basically run by the teenagers, they discuss things they want to have, do or change in the community, said Richard Dowthitt, an active TNT teen.

"We need a place to hang out," Dowthitt said. "We don't care all that much about cruising up and down (the street), but there is nothing else to do."

"We want a place where we can play pool, dance, exer-

cise, play video games, talk, watch TV, listen to music or study."

"My dream is a halfway house for teens who need a temporary home," Mrs. Simoneaux added. "Many of these kids have been kicked out of their house by their parents, or the parents moved away and left them to wander the streets alone with no money. Hopefully, then we could find someone to provide much needed counseling."

Recent projects include a newsletter that a couple of churches have volunteered to help print, a teen-age fashion show and a street dance.

Bought antique one

Fire truck fancy of man

By SUSAN McCARY Sulphur Springs News-Telegram
SULPHUR SPRINGS, Texas (AP) — Most men (and quite a few women) can recall their first sight of a bright red fire truck under a Christmas tree or parked by a birthday cake.

Even long after experience has taught lovers of fire engines that firefighting is a dirty, dangerous business, the image of a fireman is still one of immense appeal — a little boy's dream that lingers in the man.

Not every little boy can grow up to be a firefighter, either as a professional or as a volunteer, but Tom Powell of Brashear found a way to "live the fantasy." He bought an "antique" fire truck.

Powell was living in Newport Beach, Calif. at the time he bought the 1949 Ford La France pumper truck about 19 months ago.

He rather sheepishly admits that he really doesn't know why he bought the truck. Although, he said, at the time he bought it, he rationalized the purchase as an advertising aid for his paint contracting business. "There was no logical reason to buy it. I just liked it. It was the kid in me, I guess," he said with a grin.

"Sparky," the fire truck, is a retiree from the Port Byron, Ill., Fire Department and owning him has been lots of fun, Powell said. Already the two, both in their early 30s, have had several adventures. Although "Sparky" has a special historical vehicle license from the State of California, it is in near mint condition, and all of the equipment it carries, with the exception of the ladder, is original.

The pair's latest adventures was making the 1,520-mile trip from Newport Beach to Brashear in Northeast Texas, most of it following Interstate 10 across the desert Southwest.

"Without really thinking, I started out across the desert at midday," Powell said. The "southern route" from California to Texas is

notorious for its combination of inferno-like heat and steep grades that make for a grueling test for men and their machines.

"Sparky did just fine. At one point, the temperature gauge did edge over a little, so I pulled over to let him rest for a while, just to be on the safe side," Powell said of his super toy.

Without his accustomed air conditioning, Powell said, he was a little overheated, too. "Bust as long as we were moving and I had plenty of fluids to drink — you can sweat a lot out there — it was OK," Powell said of desert motoring.

Powell's main concern was not the heat or steep grades, but his fuel supply and the long distances between stations. "Sparky gets about seven miles to the gallon, tops, and has a range of about 140 miles at best," Powell explained. "When it is sometimes 100 miles or more between stations, even with a five-gallon can of emergency fuel, I couldn't ignore the gas gauge," he added.

Powell commented about the \$261 it cost him for fuel on the 3½-day trip. "Although it was fun, I don't think I want to take any more long trips with Sparky," he said.

On the trip, Powell noted that drivers fell into three groups: those who did not appear to see the fire truck at all; those who almost wrecked their vehicles trying to see what or who and where the truck was going, and those who would stop or pull over or wave the truck by at an intersection.

"It was interesting to see the different reactions of service station attendants when I drove in," Powell said. "Some would stare at us for a minute or two before they would come out but wouldn't ask any questions. Some would come right out and start up a conversation."

Powell said he and Sparky took part in the Firemen's Muster and parade in Glendale, Calif.

There were about 100 pieces of firefighting equipment in the parade. They ranged from an antique pumper built in 1796 by a former apprentice to Paul Revere to huge, brand-new ladder trucks from the Los Angeles Fire Department, Powell said. He recalled that there were a few steamer-type pumpers in which they built a fire to build up the pressure. "It took about 20 minutes, but they were pumping water," he said.

"The Firemen's Muster, which professional or volunteer firefighting groups or owners of antique firefighting equipment may attend, is really fantastic. They have all kinds of competition between the groups, all just for fun," he said.

What else can one do with a fire truck besides fight fires or go to a fireman's picnic and parade?



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You will give the nicest Christmas present of all if you buy your family a new home. This 3 bedroom brick on Sunset is a gift for your pocket book, too, since you can move in with a low down payment and assume the existing loan. Interest won't change! Owner is transferring and this attractive home is priced right for a quick sale. Large kitchen-breakfast combo. East back yard for summer bar-b-ques. Even has a playhouse for the kids. Storm cellar. Conveniently located close to mall and schools. Let us show you today!

CHESTNUTS ROASTING AND POPCORN POPPING and you and your family are enjoying the warmth and glow of the unusual double fireplace in your beautiful new home. This dream scene can come true for you today. Come look at this top quality, tastefully decorated home on Quince. All built-ins, excellent storage, well insulated for energy efficiency. See to appreciate! Absentee owner anxious for the discriminating buyer.

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REAL ESTATE - INSURANCE
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COMICS

TELEVISION SCHEDULES

PEANUTS®

by Charles M. Schulz



STEVE CANYON® by Milton Caniff



THE BORN LOSER by Art Sansom



FRANK AND ERNEST by Bob Thaves



EEK & MEEK by Howie Schneider



Crossword

ACROSS

- Vine-covered
- Feudal estate
- Paper
- Watched after
- Phono inventor
- Egg on
- Container
- Solar disc
- 20 Descarts
- 23 Dentine
- 26 Stage need
- 27 Sunflower state (abbr.)
- 30 Starve
- 32 Pulley
- 34 Tough
- 35 Leather maker
- 36 In addition
- 37 Inordinate
- 38 self-esteem
- 39 Explosive (sl.)
- 40 Multiplied by
- 42 Punish
- 45 Arrival-time
- 46 Rabid
- 49 King of fairies

DOWN

- Single thing (prefix)
- For instance (Lat.)
- Egyptian deity
- Curvy letter
- 5 Couple
- Swamp
- 7 S. Amer. Indians
- 8 Redact
- 9 Lawn party
- 11 Inside (pref.)
- 12 Smallest
- 13 Lair
- 18 Mental component
- 20 Happy expression
- 21 Edible bivalve
- 22 Gaseous compound
- 23 Questionable
- 24 Valley
- 25 Fail to mention
- 27 German philosopher
- 28 Verify
- 29 Roman emperor
- 31 Sanitation
- 33 Novelist
- 34 Love-to
- 38 Choose
- 40 The planet earth
- 41 Newspaper edition
- 42 Fastidious man
- 43 In the same place (abbr.)
- 44 Never (constr.)
- 46 Average
- 47 European mountains
- 48 Love-to excess
- 50 Sphere
- 52 Conjunction (Ger.)
- 53 Before (prefix)

Answer to Previous Puzzle

USED USES THE
BAJA BANI EEL
EGAD ONETRAK
ROC RAG ARKS

UNIT TIP
GELID GODSEND
URALURNS TIE
TIT OTIS BENE
SCENTED GORED
ITS TAP ONI

US IS TAP AKK
PURIFIER ULNA
ORE USER BLEA
NED NOSY EYES

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ALLEY OOP by Dave Graue



MARMADUKE®

"It's a real shame that I can't rearrange the furniture in this house because of you!"

SUNDAY

AFTERNOON

12:00 (7) Beyond the Horizon
(8) NFL Football: Teams to be Announced
(9) MOVIE: 'Dynasty' A tale of jealousy, hatred, deception and rivalry spans thirty-five years of the history of a 19th century Ohio family. Harrison Ford, Sarah Miles, Stacy Keach. 1976.
(10) Pro Sport Show
(11) Church Triumphant
(12) MOVIE: 'Charlie Chan at the Opera' Music mixes with murder and the famed Charlie Chan is called in to solve the mystery. Warner Oland, Helen Wood. 1936.
(13) News/Sports/Weather
(14) Health Week
(15) Para Gente Grande
(16) 1983 American Cup Challenge
(17) Contact
(18) MOVIE: 'Shenandoah' During the Civil War, a farmer tries to remain neutral but becomes involved when his only daughter becomes engaged to a Confederate soldier. James Stewart, Doug McClure, Glenn Corbett. 1965.
(19) Alpine Ski School
(20) News/Sports/Weather
(21) 10-Kilometer Run
(22) Money Week
(23) Going Great
(24) MOVIE: 'Angel and the Badman' A notorious gunslinger is nursed to health by a French orator who wins him over to her Quaker philosophy, a belief which is tested when another triggerman shows up in town. John Wayne, Gail Russell, Bruce Cabot. 1947.
(25) Undersea World of Jacques Cousteau
(26) Rex Humbard
(27) PGA Golf: Chrysler Team Invitational - Final Round from Boca Raton, FL
(28) News Update
(29) Pellicula: 'Yo Bailen con Dor' Porfirio
(30) IHOV Cavett Behind the Scenes
(31) Adventures Of Black Beauty
(32) Time Out Theater
(33) Week In Review
(34) Phil Arms Presents
(35) MOVIE: 'Funny Face' A fashion magazine photographer sends a girl from a book store to Paris. Fred Astaire, Audrey Hepburn, Kay Thompson. 1957.
(36) CNN Headline News
(37) Style With Elsa Klensch (HBO) Barbara Mandrell - The Lady Is a Champ
(38) Livewire
(39) USA Salutes Kids
(40) MOVIE: 'Shenandoah' During the Civil War, a farmer tries to remain neutral but becomes involved when his only daughter becomes engaged to a Confederate soldier. James Stewart, Doug McClure, Glenn Corbett. 1965.
(41) Kung Fu
(42) In Touch
(43) Tom Landry Show
(44) News Update
(45) Co-Ed
(46) MOVIE: 'Never Too Late' A middle-aged couple with a married daughter discovers that they are expecting another child. Maureen O'Sullivan, Paul Ford, Connie Stevens. 1965.
(47) Media Watch
(48) NFL Today
(49) Big Story
(50) Blue Fin
(51) 'You' Mag. for Women
(52) Wagon Train
(53) NFL Football: Teams to be Announced
(54) Mary Tyler Moore
(55) Rev. Stan Rosenthal

EVENING

6:00 (1) First Camera
(2) Best of World Championship Wrestling
(3) Pope and His Vatican Bill Blakemore presents a look at what Pope John Paul II's day is like. (R) (60 min.)
(4) Good News
(5) 60 Minutes
(6) World Sportsman
(7) News Update
(8) Esclava Isaura
(9) Livewire
(10) MOVIE: 'Young Hero' Voyage to the Bottom of the Sea
(11) Sports Sunday
(12) Flying House
(13) Camp Meeting USA
(14) Taking Advantage
(15) Grandes Series: Simon (HBO) Fraggie Rock
(16) Inheritance
(17) Knight Rider Michael and

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(3) News Update
(4) Round Circle
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(21) Starry, Starry, Starry! Camera Action!
(22) MOVIE: 'The Man from Snowy River' A young man comes of age at the turn of the century in this old fashioned 'Western' from Australia. Kirk Douglas, Tom Burlinson. 1982. Rated PG.
(23) G.I. Joe - A Real American Hero
(24) News
(25) Jerry Falwell
(26) News/Sports/Weather
(27) Alfred Hitchcock Hour
(28) Nice People
(29) Pro Sport Show
(30) 1983 American Cup Challenge
(31) Inside Business
(32) Tamas y Debates
(33) Mr. Wizard's World

10:45 (1) NFL Football: Tampa Bay at Detroit
(2) Nastase - Hamptons Tennis Invitational: Singles and Doubles Finals from North Miami, FL
(3) News Update
(4) Round Circle
(5) MOVIE: 'Vanishing Wilderness' This documentary shows the animals and terrain of North America from the Everglades to the Arctic. 1974. Rated G.
(6) Ovation
(7) Health Week
(8) Para Gente Grande
(9) 1983 American Cup Challenge
(10) Contact
(11) MOVIE: 'Shenandoah' During the Civil War, a farmer tries to remain neutral but becomes involved when his only daughter becomes engaged to a Confederate soldier. James Stewart, Doug McClure, Glenn Corbett. 1965.
(12) Evans and Novak
(13) MOVIE: 'Daddy Long Legs' A millionaire playboy arranges to send a French orphan to college with the proviso his identity be kept secret. Fred Astaire, Leslie Caron, Mary Moore. 1955.
(14) MOVIE: 'Red River Valley' Roy resumes a childhood romance with the sheriff's daughter. Roy Rogers, Gale Storm, George 'Gabby' Hayes. 1947.
(15) Dr. D. James Kennedy
(16) News/Sports/Weather
(17) Against the Odds
(18) Portrait of America: Iowa
(19) 1983 USGA Championship
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11:00 (1) NFL Football: Tampa Bay at Detroit
(2) Nastase - Hamptons Tennis Invitational: Singles and Doubles Finals from North Miami, FL
(3) News Update
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(29) Pro Sport Show
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(31) Inside Business
(32) Tamas y Debates
(33) Mr. Wizard's World

11:15 (1) NFL Football: Tampa Bay at Detroit
(2) Nastase - Hamptons Tennis Invitational: Singles and Doubles Finals from North Miami, FL
(3) News Update
(4) Round Circle
(5) MOVIE: 'Vanishing Wilderness' This documentary shows the animals and terrain of North America from the Everglades to the Arctic. 1974. Rated G.
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11:30 (1) NFL Football: Tampa Bay at Detroit
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(14) MOV

Entertainment



Billboard's Top Ten

By The Associated Press
The following are Billboard's hot record hits for the week ending December 24 as they appear in next week's issue of Billboard magazine. Copyright 1983, Billboard Publications, Inc. Reprinted with permission.

HOT SINGLES

1. "Say Say Say" Paul McCartney & Michael Jackson (Columbia)
2. "Say It Isn't So" Daryl Hall & John Oates (RCA)
3. "Union of the Snake" Duran Duran (Capitol)
4. "Owner of a Lonely Heart" Yes (A&M)
5. "All Night Long" Lionel Richie (Motown)
6. "Uptown Girl" Billy Joel (Columbia)
7. "Love Is a Battlefield" Pat Benatar (Chrysalis)
8. "Twist of Fate" Olivia Newton-John (MCA)
9. "Undercover of the Night" Rolling Stones (Rolling Stones)
10. "Break My Stride" Matthew Wilder (Private I)

TOP LP'S

1. "Thriller" Michael Jackson (Epic)
2. "Can't Slow Down" Lionel Richie (Motown)
3. "What's New" Linda Ronstadt (Asylum)
4. "Synchronicity" The

COUNTRY SINGLES

1. "Houster Means I'm One Day Closer to You" Larry Gatlin & The Gatlin Bros. Band (Columbia)
2. "You Look So Good in Love" George Strait (MCA)
3. "Slow Burn" T.G. Shepard (Warner-Curb)
4. "Black Sheep" John Anderson (Warner Bros.)
5. "Ev'ry Heart Should Have One" Charley Pride (RCA)
6. "Ozark Mountain Jubilee" The Oak Ridge Boys (MCA)
7. "In My Eyes" John Conlee (MCA)
8. "You Made a Wanted Man of Me" Ronnie McDowell (Epic)
9. "Dance Little Jean" Nitty Gritty Dirt Band (Liberty)
10. "I Wonder Where We'd Be Tonight" Vern Gosdin (Complanet)

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ADULT CONTEMPORARY

1. "Read 'Em and Weep" Barry Manilow (Arista)
2. "The Way He Makes Me Feel" Barbra Streisand (Columbia)
3. "Say Say Say" Paul McCartney & Michael Jackson (Columbia)

'Terms' made actor Nicholson weep

By BOB THOMAS
Associated Press Writer
LOS ANGELES (AP) — He's viewed as the kind of guy who wouldn't cry at his best friend's funeral — a slightly cynical, non-heroic, self-preservationist, because those are the characters he plays.
But Jack Nicholson can indeed shed a tear or two.
"Oh, I can cry," he says defensively. "I well up if something great is happening. I cry over (boxing greats) Roberto Duran and Muhammad Ali. I cry for the

Phillies, because they're my kind of baseball team; I like teams that play on natural grass and wear baggie uniforms, not those softball uniforms that some teams wear."
As for films, Nicholson says, "I cry over sad movies if they're well done; if they're cloying, I resist the tears."
But Nicholson, who rarely cries over movie scripts, did when he read James L. Brooks' "Terms of Endearment." It is the film that broke a two-year sabbatical for the actor.

"Terms of Endearment" is as original in its treatment of human feelings as any film in the past five years. Shirley MacLaine and Debra Winger play a mother and daughter whose fierce independence cause them to battle and reconcile over the years. Nicholson is an over-the-hill astronaut wary of entanglements, including his next-door neighbor, Miss MacLaine.
Interviews with Jack Nicholson are rare — and ritualistic. He occupies a

suite at the Bel-Air Hotel, a few minutes away from his hilltop home. He talks to the reporter one-on-one, no publicist or secretary present. The conversation is easy and wide-ranging.
He said his hiatus from movies might have lasted forever, if "Terms of Endearment" hadn't come along.
"I decided to take time off because I had made five pictures in a row. 'Goin' South,' which I directed. ... 'The Shining' took a year. Then I made 'The Postman Always Rings Twice,' 'Reds' and 'The Border' all in the same year," he said.
Nicholson is primed to work again: "I'll make one or two more pictures as an actor, then I'd like to direct again. I've acquired a couple of properties — 'The Murder of Napoleon' and 'Henderson, the Rain King.' I've been wanting to make 'Henderson' ever since it first came out years ago. My plan was to have John Wayne star in it. Now I'm old enough to play the role myself."
Nicholson, 46, has been in and around the movie business for almost 30 years.

As a teen-ager newly arrived from Neptune City, N.J., he worked in the cartoon department at MGM, acted in little theaters and made his film debut in 1958 with "The Cry Baby Killer."
He played in 20 Roger Corman cheapies before his star-

making performance in "Easy Rider." His anti-heroic roles have brought him six Academy Award nominations. He won an Oscar in 1975 for his portrayal of a mental patient in "One Flew over the Cuckoo's Nest."

CBS Christmas offering

Remick thinks film good

By JERRY BUCK AP Television Writer
LOS ANGELES (AP) — Actress Lee Remick says it took only "a matter of minutes" for her to say yes and pack her bags for Vermont to film "The Gift of Love: A Christmas Story."
Her only disappointment was that it wasn't snowing when she arrived in Vermont last March to film the two-hour movie.
The snow shows up in the film somehow, and this new Christmas special is every bit as warm and charming as Miss Remick says.
Earl Hamner wrote the screenplay from a short story by Bess Streeter Aldrich. The last time Hamner wrote a Christmas special was "The

Homecoming" in 1971. It was turned into the long-running series "The Waltons."
"My leading ladies in this are Lee Remick, Angela Lansbury and Polly Holliday," he said. "With leading ladies like that, you're halfway home."
Hamner smiled and said, "Remember the 'Heidi' that knocked the New York Jets off the air? I wrote that 'Heidi' and Delbert Mann directed it." On Nov. 17, 1968, NBC cut off the last minutes of the football game in which the Oakland Raiders rallied in the final moments to beat the New York Jets, in order to broadcast a movie version of "Heidi." Sports fans swamped the network switchboards and the incident

became a cause celebre.
Most of "The Gift of Love" is told in a flashback as Miss Remick is dreaming. She stars as a woman who loses both the family department store business and her mother shortly before Christmas. After her mother's funeral, she falls asleep and dreams of happier Christmas times. It gives her a new perspective on how to deal with the future.
Miss Remick will also be seen later this season in another movie for CBS, a romantic comedy called "A Good Sport." It was filmed this past summer in New York. She plays a fashion editor and Ralph Waite plays a rough-and-tumble sports writer.

In French circles

Balthus' exhibit 'important'

By MARILYN AUGUST
Associated Press Writer
PARIS (AP) — A major retrospective of the works of Balthus, the 20th century French painter who earned international acclaim with his erotic portrayal of young girls, has been hailed as the most important event of the French fall art calendar.
The show, which opened last month at the Pompidou Center, features 63 oils and as many ink drawings, including his illustrations of Emily Bronte's "Wuthering Heights." It will run until Jan. 23, and then travel to the Metropolitan Museum of Art in New York.
Balthus, now said to be 75, was born in Paris Balthazar Klossowski de Rola, the son of an aristocratic German of Polish descent. But if little else is known about the man

whose stiff nudes in unseemly poses shocked generations of critics the world over, that is the way he wants it.
He has refused to see the press, declaring that his works speak for themselves. Not even the show's 390-page catalog contains a single biographical detail about the mysterious man who painted nubile adolescents discovering their sexuality.
Balthus' efforts to preserve his anonymity have long infuriated French critics. His friends and neighbors refuse to talk about him, and even his brother, Pierre Klossowski, one of France's leading avant-garde intellectuals, remains silent.
Despite his disdain for the limelight, Balthus remains one of the most respected and sought-after figures in the Paris art world.
He grew up in fashionable Parisian art circles. His first collection of drawings —

published when he was only 12 — were prefaced by the German writer, Rainer Maria Rilke, who was a friend of the family.
Balthus was a friend of many French writers, including Albert Camus and Andre Malraux, and drew portraits of Antonin Artaud while they sat in the famed Dome cafe.
Pablo Picasso, the late artist, admired him and bought one of his works. Balthus was also a special advisor during Malraux's term as minister of culture. Malraux made him head of the Villa Medici, the prestigious French cultural center in Rome, where Balthus lived from 1961-76.
His paintings, of which there are 235 to date, rarely change hands. Balthus paints slowly and there is a waiting list for works he has not yet begun.



A Comedy
"Goodbye Charlie"
Stars Eileen Fulton - the star of the soap opera "As The World Turns"
Opens Dec. 6th
Three Special Days
Dec. 7th, 14th, & 21st will be two tickets for \$28.00 when you bring a toy for the Toys for Tots.
Sunday Matinee's
Dec. 11th and 19th
Show Only 2 p.m.

DANCE LESSONS
\$10.00 per month
Larrymore Studios
Phone 364-4638
Veterans Memorial Park

DOWNTOWN STAR THEATRE PHONE 364-2037
HEREFORD EARLY SHOW LATE SHOW
IT WAS A VINTAGE YEAR FOR SLAVEMONGERS, DO-GOODERS, MURDERERS, AND BULLY HAYES.
NATE AND HAYES
THE **BIG CHILL**
In a cold world you need your friends to keep you warm.
Mon.-Thurs. Buck Nite Nite 7:30 Ends Mon.
Mon.-Thurs. Buck Nite Nite 9:30 Ends Thurs.

Celebrate the Season with Stars. Give the Gift of HBO.
Fill someone's holidays with star-studded favorites like Dudley Moore and Mary Tyler Moore in the romantic movie drama *Six Weeks*. Grammy-winning pop rocker *Kenny Loggins In Concert*. And Sugar Ray Leonard's family sports series *Sugar Ray's All Stars*. Just three of the more than 60 top entertainment programs on HBO in December. Join the celebration by ordering Home Box Office* for someone now. (And if you're not an HBO subscriber already, why not treat yourself, too!)
HBO
Great Movies Are Just The Beginning.
Hereford Cablevision
126 E. 3rd 364-3912

And now is the season of Christmas, the merriest time of the year when the frosty air rings with the message it brings. May your days glow with laughter and cheer.
May each hand that you clasp be in friendship, and the smiles on each face be for you. Like the lights on the tree may your happiness be, ever gay ever bright, ever new. May each lamp be a beacon of welcome, and each door open wide at your touch. Swift as snowflakes that fly, may your joys multiply for you who have given so much.
The spirit of faith still lives today and within our hearts it comes to stay, for each one shares God's tender care — his special love goes everywhere. All praise we give to God above, for Christ's special gift of love.
God shine in every heart thy peace, till love shall rule and war shall cease. May we persist in doing good, and inspiring world wide brotherhood. Our faith and hope revived again, with peace on earth good will to men.
Have a Merry Christmas
Don't Miss A Visit With Santa Claus
This Year For Your Christmas Cheer!
For an appointment with Santa call 364-5524.

A Sporting Alternative To Sports Illustrated!
(& one that's better for them)
Gift Certificate
Date _____
\$ _____
upon presentation of this Gift Certificate, may select a gift to the value of _____ Dollars
Presented by _____ Donor's Signature
Redeemable Upon Opening of the New YMCA.
HEREFORD YMCA
HEREFORD, TEXAS 79045
TEL. (806) 364-6990
Good for any membership or any program offered by the Y.M.C.A. Sugarland Mall

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CLASSIFIED
 364-2030

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NO CAPTION TIMES RATES

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2 days, per word:	17
3 days, per word:	24
4 days, per word:	31
5th day	FREE
10 days, per word:	59
monthly, per word	200

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Deadline for classifieds is 3 p.m. daily for the next day's edition. 3 p.m. Friday for Sunday's edition.

CASH IS REQUIRED ON ADVERTISEMENTS UNDER \$10.00.

LEGALIS
 Advertising rates for legal notices are 10 cents per word for the first time the advertisement runs, and 7 cents per word for consecutive issues.

For advertising news and circulation, call 806-364-2030.

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Bedroom suit with cedar chest for sale. 538 Sycamore. 364-3517. 1-118-2c

GIVE THE UNUSUAL.
 Antique stained glass, plus new and custom items. Very reasonably priced. Call 364-2120. 1-119-5c

CORSICANA FRUIT CAKES JUST ARRIVED.
 Call Gladys Willoughby, 364-2060 days; 364-3769 nights. S-1-95-6c

FOR SALE STORAGE HOUSES SEVERAL SIZES
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 Conveniently located behind Thames Pharmacy. Dust and mouse proof. Call 364-0218 evenings; 364-2300 days. 1-112-4c

CHRISTMAS FRUIT BASKETS
 \$15 and \$20 sizes available at THE BASKET EXPRESS 364-2451. 1-116-4c

CALL US for All types of Health and Life Insurance
 STEVE NIEMAN, CLU or B.J. GILLILAND Plains Insurance 200 E. Park Ave. 364-2666 364-8030 home 1-212-4c

Patti Cake Day School
 Children ages 18 mos-8 yrs. Mon-Fri. 7:30-5:30 Call 364-1578. 1-25-4c

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 364-0951 1-tfc

BEST PRICES FOR GOLD.
 Class rings, wedding bands, 14K watches, jewelry, diamonds, coins, pocket watches, scrap gold. 804 S. 25 Mile Avenue. P.G.&S.E. 364-6617. 1-235-tfc

WASH STACKING UP??
 Drop it off while you go to work or play. We wash, dry and fold. Super Clean Laundry, 364-9022. 1-73-tfc

SHAKLEE
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For sale in time for Christmas, Avon Jewelry.
 Half price. Call 364-0806 before 7:00 p.m. 1-75-tfc

BUY, SELL & TRADE
 guns, new and used. Have some collectors items. 364-4447. 1-75-tfc

New slate bed pool table with accessories.
 New passive solar hot water panels. Amana side by side refrigerator. 364-5040. 1-89-tfc

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 Clean, fine manure delivered and spread on your yard. Also will clean alleys. Peters Yard Service. 364-3515. 1-110-5p

Several used color TV's for sale.
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PATTERN SEWING, DESIGNING and alterations.
 Experienced tailor. Call "GLORIA'S," 364-8161; Tuesday through Saturday 9-5; nights 364-2953. 1-116-22p

For Sale: 2 wheel trailer, mini bikes, bicycles, bicycle parts.
 We repair bikes. 320 Avenue C. 1-117-22p

FULLER BRUSH PRODUCTS
 Call Jessie Fuller, 364-8668 or 364-8788. S-1-157-4c

LAMPS, LAMP PARTS, ALL LIGHT BULBS.
 House of Shades and Lamp Repair, 2613 Wolflin Village, Amarillo, Texas 79019. S-1-172-4c

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Blue shag carpet. 16x12. \$40.
 Very good condition. 364-6732. 1-117-3f

5-Reconditioned tricycles for sale,
 for ages 2 through 6. Call 364-5528. 1-117-3p

Pheasant hunting for lease.
 80 acres with lake, 8 miles from Hereford. 364-3566 days; 364-1534 nights. 1-117-3c

Matching sofa and chair, blue, green, gold brocade.
 Sturdy. 3 cushion. Call after 6 p.m. 364-5405. 1-117-3p

UTILITY BILLS GOING UP??
 Insulate your attic and start saving. New and remodeled homes. Free estimates. Greg Black, 364-2777; 364-2040. 1-154-tfc

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 Oil field tubing and sucker rods, all sizes. Also large light wall pipe for feed troughs. Reasonable prices. Bernie, 806-794-4299. 1-102-tfc

WE BUY old gold, silver and diamonds.
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 Gift sets for Christmas. Colognes for men & women. Complete stock available. Lorene Norwood 423 Long 364-5132 1-102-20p

BOX CARS for sale to be moved.
 Bob Campbell, 364-4261. 1-107-tfc

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 Call 364-2006 for new starts, or if you miss a paper. 1-108-22c

SATELLITE TV SYSTEM
 with remote lift. Repossessed-take over payments. Gets over 70 channels of entertainment. Barrick Furniture, West Hwy. 60. 1-113-tfc

Need a \$2,000.00 tax deduction this year?
 Call Marvin James, Southwestern Life, 415 N. Main. Phone 364-7344 or 364-8651. People helping people! 1-113-3p

"DOUBLE HOSTESS CREDITS"
 during December and January. Call Gail Blain, distributor for Fay Swafford Originals-ladies purses, luggage, accessories. 364-4513. 1-118-5p

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FOR SALE: Large overhead gas heater.
 17,000 BTU. \$175.00 Call 364-2011 days, 364-4176 nights. 1-118-2p

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 Also 1977 XL 350 Honda, low mileage. Call 364-4513. 1-118-5p

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190 sq. yds. of clean used carpet.
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 \$695.00 with warranty or \$595.00 without warranty. Call 364-7344 or 364-8651. 1-113-8p

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1962 Ford flat bed dump truck with three sizes of sides and ramp.
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 Telephone answering service available. James Gentry Realtor. 364-6400. 5-116-tfc

Two furnished trailer houses with two bedrooms each.
 \$150 monthly or \$35 weekly. \$50 deposit. Call 364-2410. 5-117-5p

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House for rent at 308 Avenue B.
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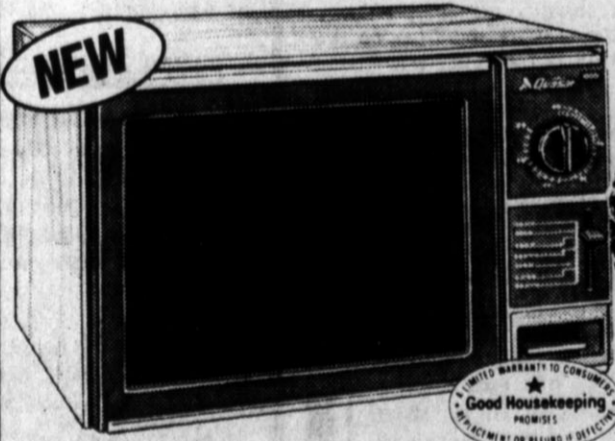


134 CHANNEL TUNING

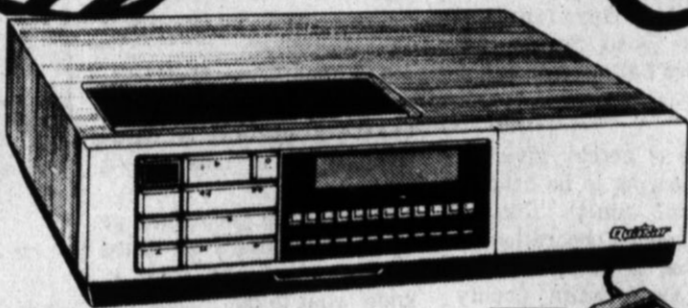
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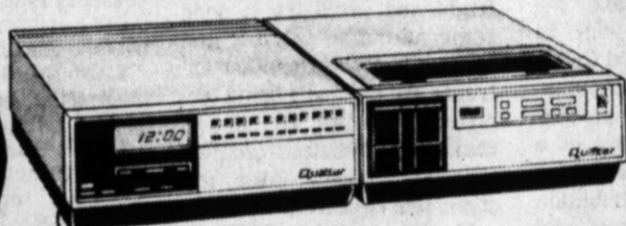
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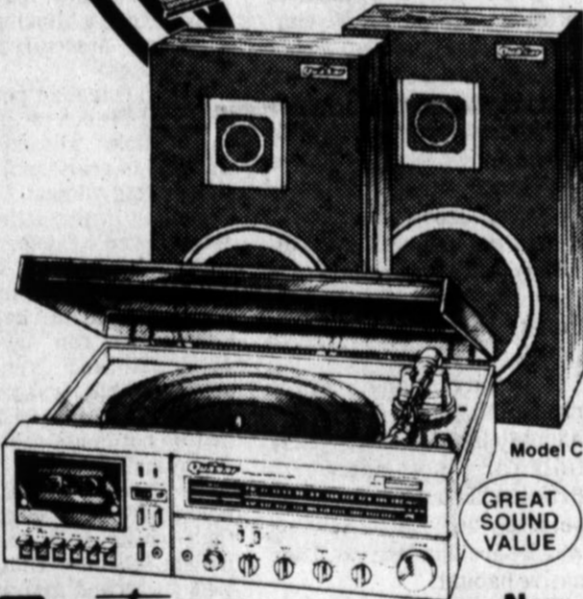
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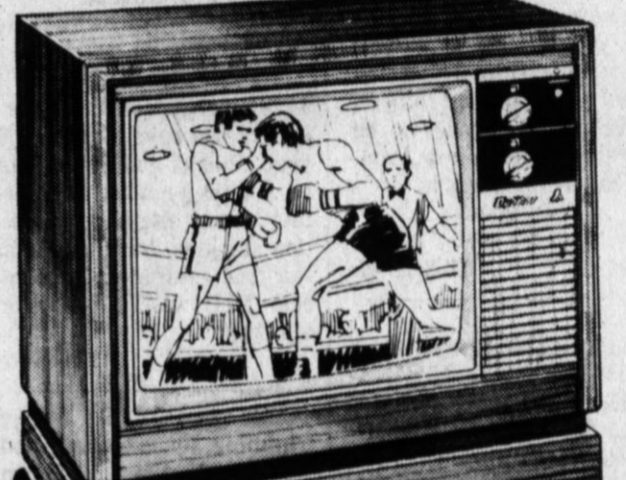


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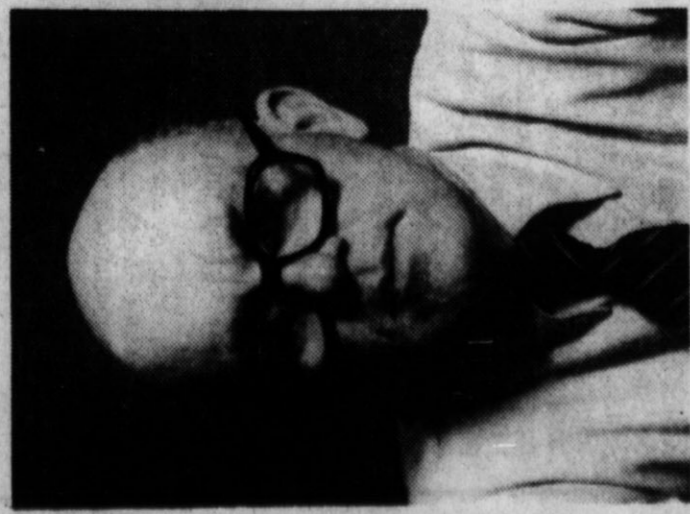
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How this series was written



Donald L. Barlett

For 18 months, Donald L. Barlett and James B. Steele, The Inquirer's Pulitzer Prize-winning investigative reporting team, crisscrossed the United States studying the handling of radioactive waste.

During their investigation, which spanned 20,000 miles, they assembled more than 125,000 pages of government documents, legal records, corporate files, congressional hearing transcripts, scientific studies, internal memoranda of public agencies and private businesses, and other miscellaneous reports.

The material was obtained from dozens of agencies and departments at every level of government; from state and federal courts; from medical and research institutions; from universities and corporations. Some records were secured through the federal Freedom of Information Act.

Agencies whose records were examined ranged from the Louisiana Stream Control Commission in Baton Rouge to the Bureau County Zoning Board of Appeals in Princeton, Ill.; from the New York Energy Research and Development Authority in Albany to the California Department of Health Services in Sacramento; from the U.S. District Court in Lincoln, Neb., to the Brazoria County District Court in



James B. Steele

Angleton, Texas. In addition, the reporters interviewed dozens of people, including officials of local, state and federal governments; representatives of the nuclear industry and the environmental community; nuclear physicists and researchers in medical and academic institutions; and citizens who have been touched by the issue.

The results of their findings are spelled out in this series of eight articles, "Forevermore: Nuclear Waste in America."

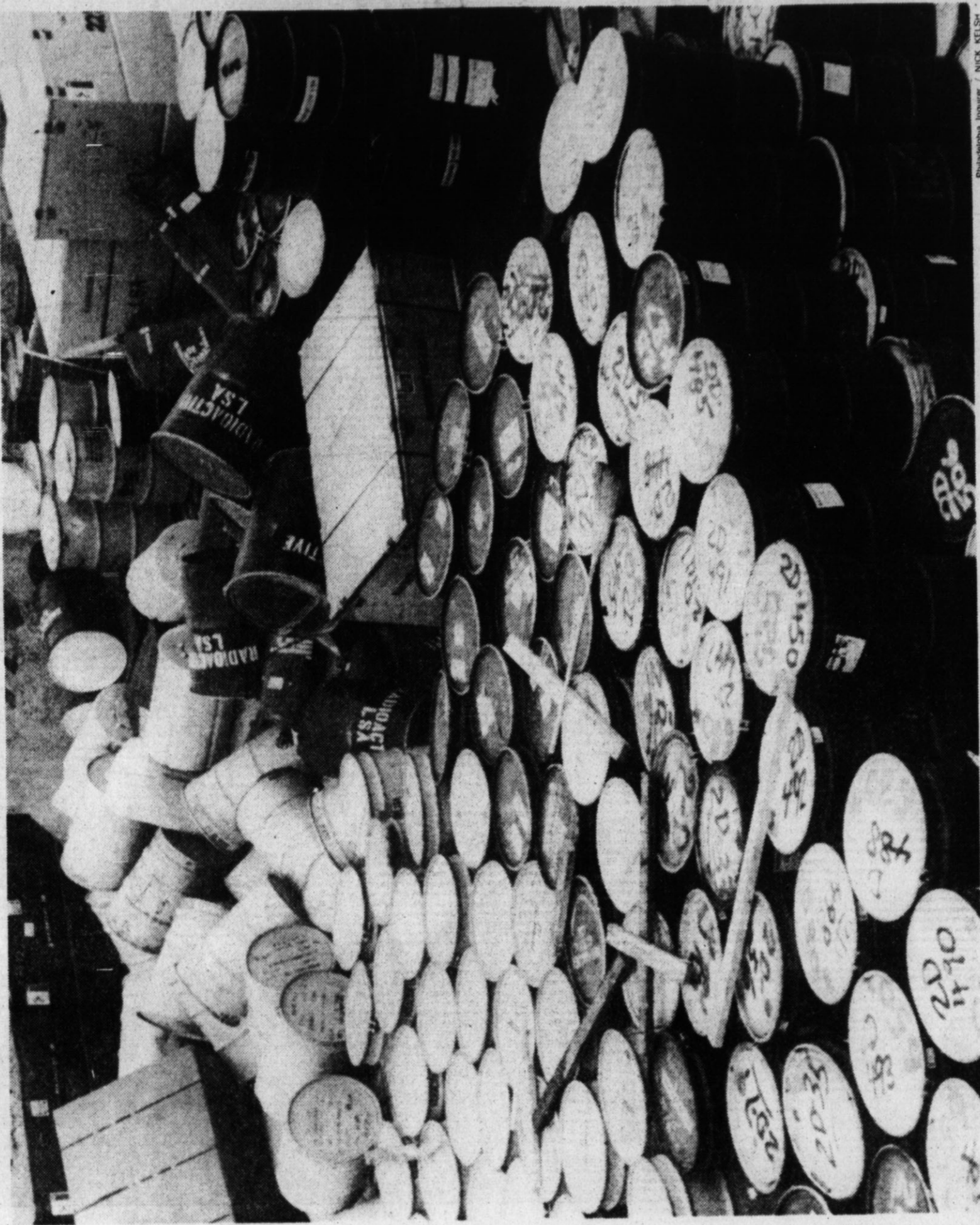
Unless otherwise indicated, all statistical information, including that on which the analyses were based, came from one of the following sources:

Federal agencies, such as the Department of Energy and the Nuclear Regulatory Commission; state agencies, such as the Washington Department of Social and Health Services and the Nevada Department of Human Resources; companies involved in handling radioactive waste, such as Chem-Nuclear Systems Inc. and US Ecology Inc.; and companies and institutions working under government contracts, such as EG&G Idaho Inc. and the Battelle Memorial Institute.

Elizabeth Coady, a member of The Inquirer's editorial department staff, assisted with the research.

Reprinted from an Inquirer series published Nov. 13-20, 1983

Forevermore: Nuclear Waste in America



Barrels of radioactive waste await burial at the Barnwell, S.C., nuclear cemetery, one of just three commercial dumps in the nation

At first it was a trickle. Now it is a torrent. For 40 years, government and industry have been postponing a crucial decision — what to do with the lethal mountains of nuclear waste that dot America and grow higher each day. For 40 years, half-hearted

solutions have been tried, then cast aside. Now, the age of runaway nuclear waste production is upon us. And neither science nor politics nor business is prepared for it. This series of articles resulted from a major Inquirer investigation of nuclear waste in America.



The Philadelphia Inquirer
P.O. BOX 8263
400 North Broad Street
Philadelphia, Pa. 19101

AN EDITORIAL

Perils of nuclear waste can be ignored no longer

The volume of radioactive waste scattered across the nation's landscape today is enough to kill every American. Soon, the radioactivity contained in that waste will be enough to kill every one of the Earth's inhabitants. That is the most extreme measure of the threat, and perhaps an oversimplification, but it is an accurate yardstick of the severity of the problem.

There is no means now to dispose safely of most of this deadly debris. There is little prospect that such technology will be in place during this century.

For 40 years, America has indulged itself in the Atomic Age. That indulgence carries with it an awesome price. That price will not be borne by those who promoted or profited from the atom or those who partook of its energy. It will be paid forever, by children and their children. It will be paid forever.

When this era's history is written, management of nuclear waste might rank as the 20th century's largest scientific and political blunder. In no other area of technology have so many experts been so wrong so consistently. In no other area of science has so little been learned from so many mistakes.

Today, the Inquirer concludes a series of articles examining the legacy of those decades of indulgence. The series, appropriately titled "Forevermore," details the failures of America's radioactive waste management efforts and outlines the consequences of those failures. Both are enormous.

The articles, written by Donald L. Barlett and James B. Steele, conclude that at present there is no solution to the lethal legacy of the Atomic Age. The reason for that is both complex and simple. It is rooted in the steadfast refusal of those who have led America down the nuclear path to admit that the atom poses unique and unprecedented safety problems.

The atom is not just another energy form; atomic garbage is not just another kind of trash. Radioactive materials are unlike any other in the environment, requiring special precautions and safeguards. But those who have professed to regulate it, never have come to grips with these realities. As a result, in four decades America has been littered with wastes that will haunt mankind for as long as he occupies the Earth.

with such a plan based on as little technological data as exists today represents unprecedented folly. Yet that is precisely what the U.S. government is doing.

The other solution — reprocessing the wastes — also is fraught with problems and absence of meaningful experience.

- Concede the obvious: that nuclear reactors, of necessity, must become temporary high-level waste-storage sites. This concession runs contrary to the assurances made by the government and the utility industry to the public and contrary to the original design of those plants. The alternative is to turn America's highways into nuclear thoroughfares with wastes moved around in a nuclear shell game.

A tentative Nuclear Regulatory Commission regulation allows utilities to begin long-term storage of used fuel in pools of water alongside their reactor units. That rule must be expanded to encourage utilities to use other methods of storage involving dry casks, which remove the risk of cooling system failure that plagues the pools. Additional decisions, and regulations, governing long-term on-site storage must be scrutinized closely by federal authorities with safety — not convenience — the foremost priority.

By eliminating this most pressing waste-management problem — that posed by reactor fuel — decisions on a final solution could be made deliberately, based on knowledge, not expedience.

- Remove the Departments of Energy and Defense from conducting research and setting standards relating to the health and safety of nuclear materials and byproducts. As The Inquirer series points out today, assessments of the dangers of radiation have been proved incorrect again and again. As a result, thousands of Americans have been exposed to high levels of radiation.

This historical failing is attributable to one fact: Those responsible for setting the standards and regulating exposures have placed a higher priority on promoting the growth and development of the atom than on safety. Even today, the bulk of federal research on the hazards of radiation is conducted by scientists working for agencies, or federal contractors, whose primary function is something other than public health protection.

- Redefine what constitutes low-level radioactive waste. Regulations affecting so-called low-level radioactive waste are written as if that waste were, indeed, of minimal threat to the environment. Yet some low-level waste is extremely radioactive and totally unsuited to the shallow-land burial now permitted under law. If the most dangerous types of that waste were removed and returned to the generator (usually utilities) for storage, shallow-land burial in a suitable site becomes an acceptable means of disposal.

- Institute a federal program of vigorous, effective cradle-to-grave monitoring of radioactive materials. Between 1980 and 1982, 400,000 curies of radioactivity were "lost" in this country. At present, there is no system for tracking radioactive wastes. Leaking barrels of nuclear garbage sit in warehouses and on back lots all over the United States, uncounted and unregulated.

A similar tracking program was instituted by Congress for hazardous chemicals. And although it has achieved only limited success, it is a step in the right direction. Nuclear materials must have a similar program.

Virtually every major claim made about nuclear energy by its promoters has proved to be empty talk. The course of nuclear energy development has been consistent only in its mismanagement and miscalculation.

The blame must be shared equally by the nuclear industry and the federal government. There could be no other apportionment of responsibility, for in matters nuclear, the public and private sectors are so tightly intertwined and intermingled that separation always has proved impossible.

That has not prevented the nuclear industry from blaming the federal government for its woes, nor has it precluded the federal government from faulting private industry for the failures plaguing nuclear management. This rhetoric and scapegoating have served only one purpose: to cloud the enormity of the problem and postpone the day of reckoning.

As The Inquirer series reveals, the need for a radical revision of America's nuclear waste management policies is immediate. The mistakes of the past are staggering. But, as reporters Barlett and Steele pointed out, the worst is yet to come, for the generation of nuclear waste stands as one of America's real growth industries and the volumes and problems extant today will seem small within a few years.

What, then, can be done to remedy the mistakes of the past? The answer involves changes in policies and mind-sets; it demands constancy and boldness. Above all, it requires that those responsible for setting nuclear policy in the United States make decisions that future generations can live with.

To achieve this, policy-makers must do the following:

• Admit that the technology for safely managing nuclear waste is not in hand. There is no solution to the waste-disposal problem because industry and government regulators never have admitted there are problems. As The Inquirer series reported, no one even knows fully what the technical problems are.

For years, one solution to America's nuclear-waste problems has been construction of an underground disposal site for high-level radioactive garbage. That has been held out by federal officials and accepted by private industry despite the fact that no one really knows if such a repository could contain the deadly materials 10 years, let alone 100,000 years. To proceed

The most constant feature of America's peaceful development of the atom is the chain of unfulfilled promises. Virtually every major claim made about nuclear energy by its promoters has proved to be empty talk. The course of nuclear energy development has been consistent only in its mismanagement and miscalculation.

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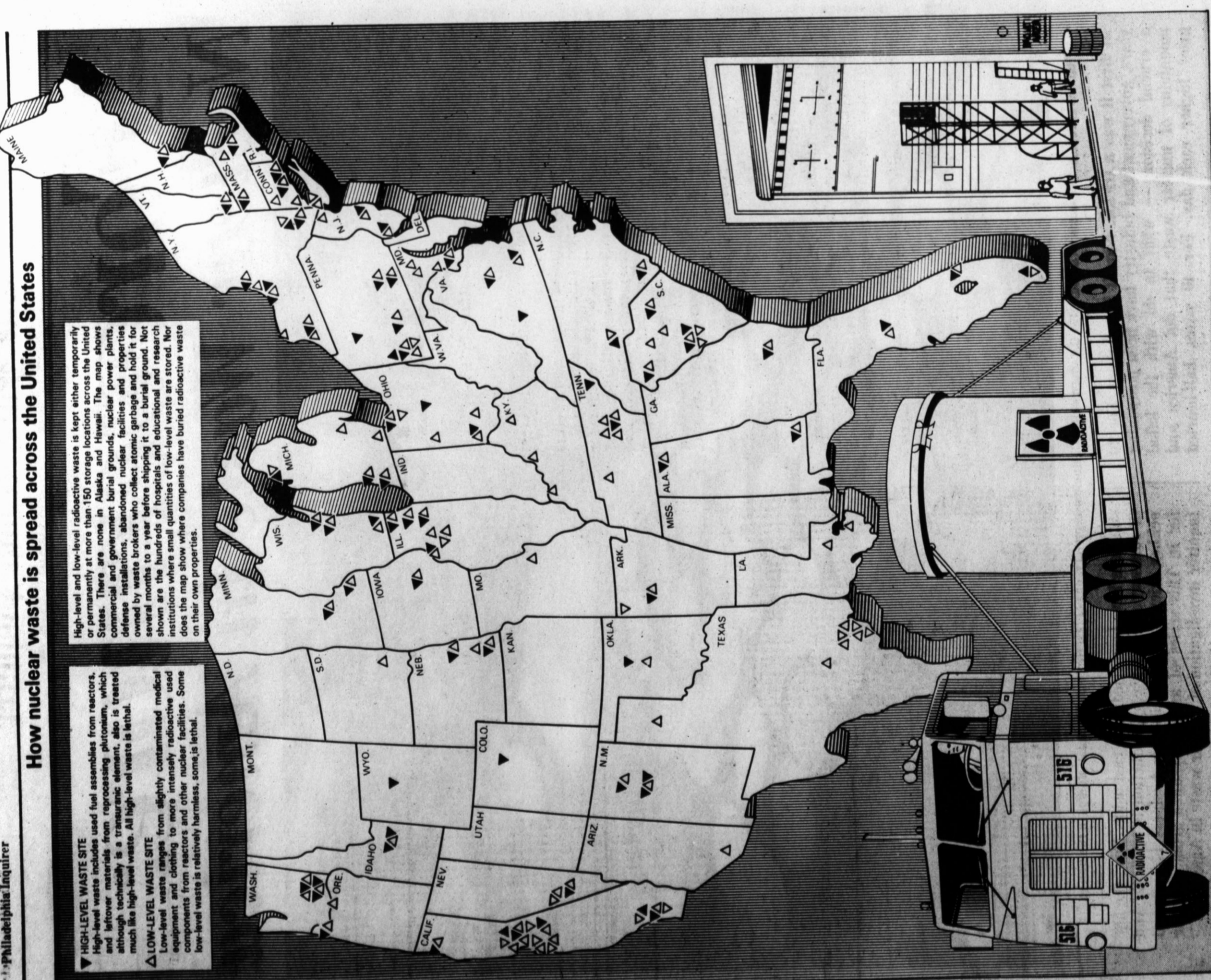
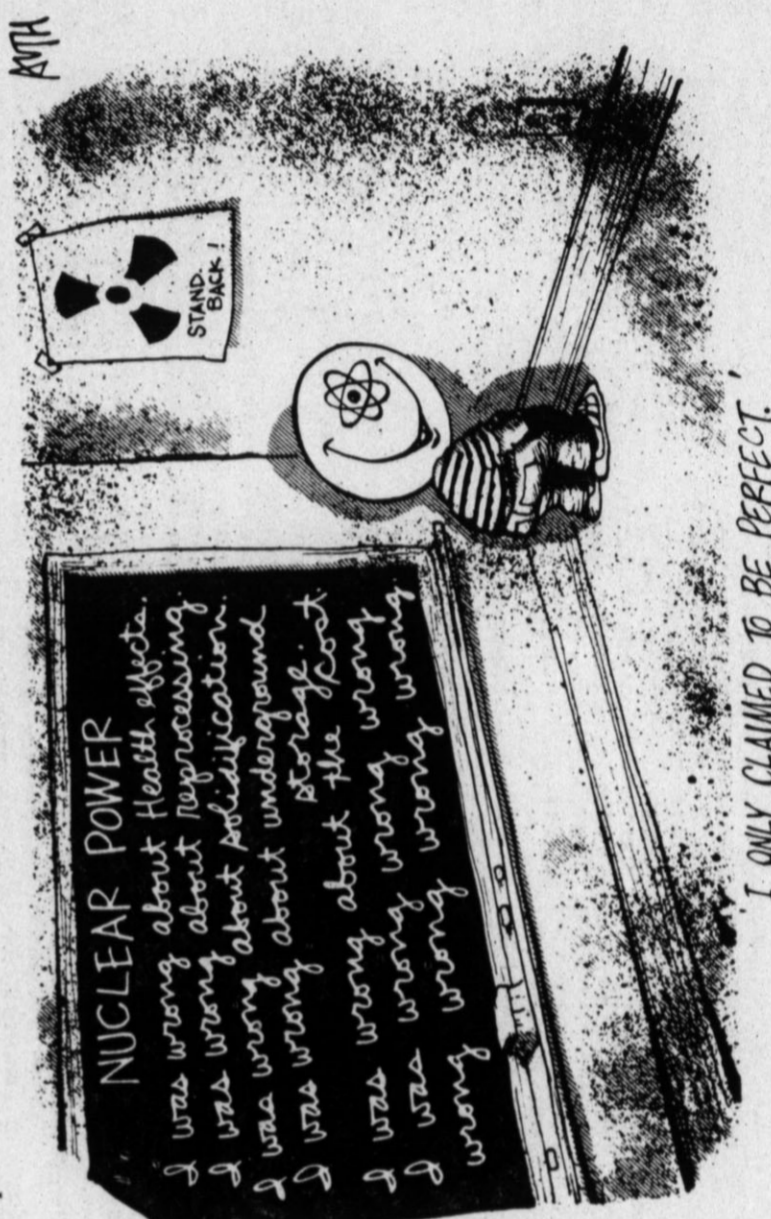
As The Inquirer series reveals, the need for a radical revision of America's nuclear waste management policies is immediate. The mistakes of the past are staggering. But, as reporters Barlett and Steele pointed out, the worst is yet to come, for the generation of nuclear waste stands as one of America's real growth industries and the volumes and problems extant today will seem small within a few years.

What, then, can be done to remedy the mistakes of the past? The answer involves changes in policies and mind-sets; it demands constancy and boldness. Above all, it requires that those responsible for setting nuclear policy in the United States make decisions that future generations can live with.

To achieve this, policy-makers must do the following:

• Admit that the technology for safely managing nuclear waste is not in hand. There is no solution to the waste-disposal problem because industry and government regulators never have admitted there are problems. As The Inquirer series reported, no one even knows fully what the technical problems are.

For years, one solution to America's nuclear-waste problems has been construction of an underground disposal site for high-level radioactive garbage. That has been held out by federal officials and accepted by private industry despite the fact that no one really knows if such a repository could contain the deadly materials 10 years, let alone 100,000 years. To proceed



How nuclear waste is spread across the United States

High-level and low-level radioactive waste is kept either temporarily or permanently at more than 150 storage locations across the United States. There are none in Alaska or Hawaii. The map shows commercial and government burial grounds, nuclear power plants, defense installations, abandoned power facilities and properties owned by waste brokers who collect atomic garbage and hold it for several months to a year before shipping it to a burial ground. Not shown are the hundreds of hospitals and educational and research institutions where small quantities of low-level waste are stored. Nor does the map show where companies have buried radioactive waste on their own properties.

▲ HIGH-LEVEL WASTE SITE
High-level waste includes used fuel assemblies from reactors, and leftover materials from reprocessing plutonium, which although technically is a transuranic element, also is treated much like high-level waste. All high-level waste is lethal.

▲ LOW-LEVEL WASTE SITE
Low-level waste ranges from slightly contaminated medical equipment and clothing to more intensely radioactive used components from reactors and other nuclear facilities. Some low-level waste is relatively harmless, some is lethal.

FOREVERMORE,

the retarded children" on the island.

"It is a statement of fact," Conard wrote, "that the early growth retardation in the children was not recognized as being related to thyroid injury until abnormality of that gland was noted. Treatment was instituted as soon as this fact was apparent."

In a footnote to a request for \$600,000 in additional funds submitted to a House Appropriations subcommittee in 1978, the Interior Department, which already had received more than \$1 million to compensate the islanders, offered this terse explanation of its need for more money:

"The current request would provide \$175,000 for compensation for seven additional cases that appeared. . . . It contains \$75,000 to provide full death payment for the individual who died of leukemia. . . . Also requested is \$225,000 as a reserve fund to cover compensation for at least nine additional cases or possible death compensation. . . . Medical authorities now anticipate that up to five new cases a year can be expected."

Fifty miles west of Rongelap, on the coral atoll of Bikini, another group of islanders provides stark evidence that the federal government does not have the slightest idea how radioactive waste will behave in the earth over a period of time.

This story begins in 1946, when the residents were moved off Bikini to make way for U.S. hydrogen bomb tests.

From 1946 to 1958, more than 20 bombs were exploded on the atoll. A decade after the tests were completed, on Aug. 12, 1968, President Lyndon B. Johnson announced plans to permit the islanders to return.

Johnson said that a committee of consultants, which an Interior Department official later described as "a blue-ribbon panel," had advised the AEC that the Bikini atoll "is again safe for human habitation."

Over the next several years, a federal cleanup program stripped the atoll of vegetation contaminated with radioactive waste, put down a layer of fresh topsoil and planted 100,000 coconut trees and other food crops. Houses and community facilities were built.

The coconut trees were especially important. An Interior Department report pointed out that "the coconut is essential to life on a coral atoll, providing food, drink, building materials and equally important, virtually the sole source of cash."

In deciding whether to permit the Bikini islanders to return home, President Johnson relied largely on radiological studies and recommendations by the AEC, and on an analysis of those studies by the committee of blue-ribbon consultants.

In its report, stamped for "Official Use Only," and treated as classified information, the panel of scientific experts said the Bikini islanders could resume their former lifestyle on the island and that they need avoid only one former food source: coconut crabs.

The panel said it feared that the radioactivity level in the crabs could rise above minimum standards because strontium 90 collected in their shells, which the crabs shed and ate.

Otherwise, the panel told the Pres-

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more radiologically safe than Denver, were evacuated once again.

The food crops that the Atomic Energy Commission once said could be eaten without fear were inedible. Every single food crop, an Interior Department official said later, "turned out to be contaminated when grown on Bikini."

The Bikini islanders, resettled on another island now, have been told that they cannot go home until sometime well into the 21st century.

In June this year, the U.S. government and the government of the Marshall Islands reached an agreement under which the United States will set up a \$150 million fund for all islanders as "a means to address past, present and future consequences of the nuclear testing program."

From the \$150 million and its earnings in the coming years, \$75 million will go to the former Bikini residents and \$75 million will go to the Rongelap islanders "for loss or damage to property and person."

In return, the islanders agreed to drop the multimillion-dollar lawsuit they filed against the United States.

Despite the mistakes in dealing with the Marshall Islands — and the disease and death they caused — the federal government now is confident that radioactive waste buried in a repository will behave just as it predicts. Well, almost.

In its tentative regulations for the repository, the Environmental Protection Agency said it was possible that "after many hundreds or thousands of years, some of the waste may dissolve" and find its way into fresh-water supplies.

But anyone who happened to drink the water, the EPA assured the public, would receive only a minimal dose of radiation.

"Indeed," the agency declared, "in most cases we would expect that any additional exposure would be so small as to be considered trivial to the individuals involved."

Nonetheless, the EPA has covered itself in its proposed regulations just in case something goes wrong underground and it becomes necessary for the children of today's waste producers to retrieve the atomic garbage.

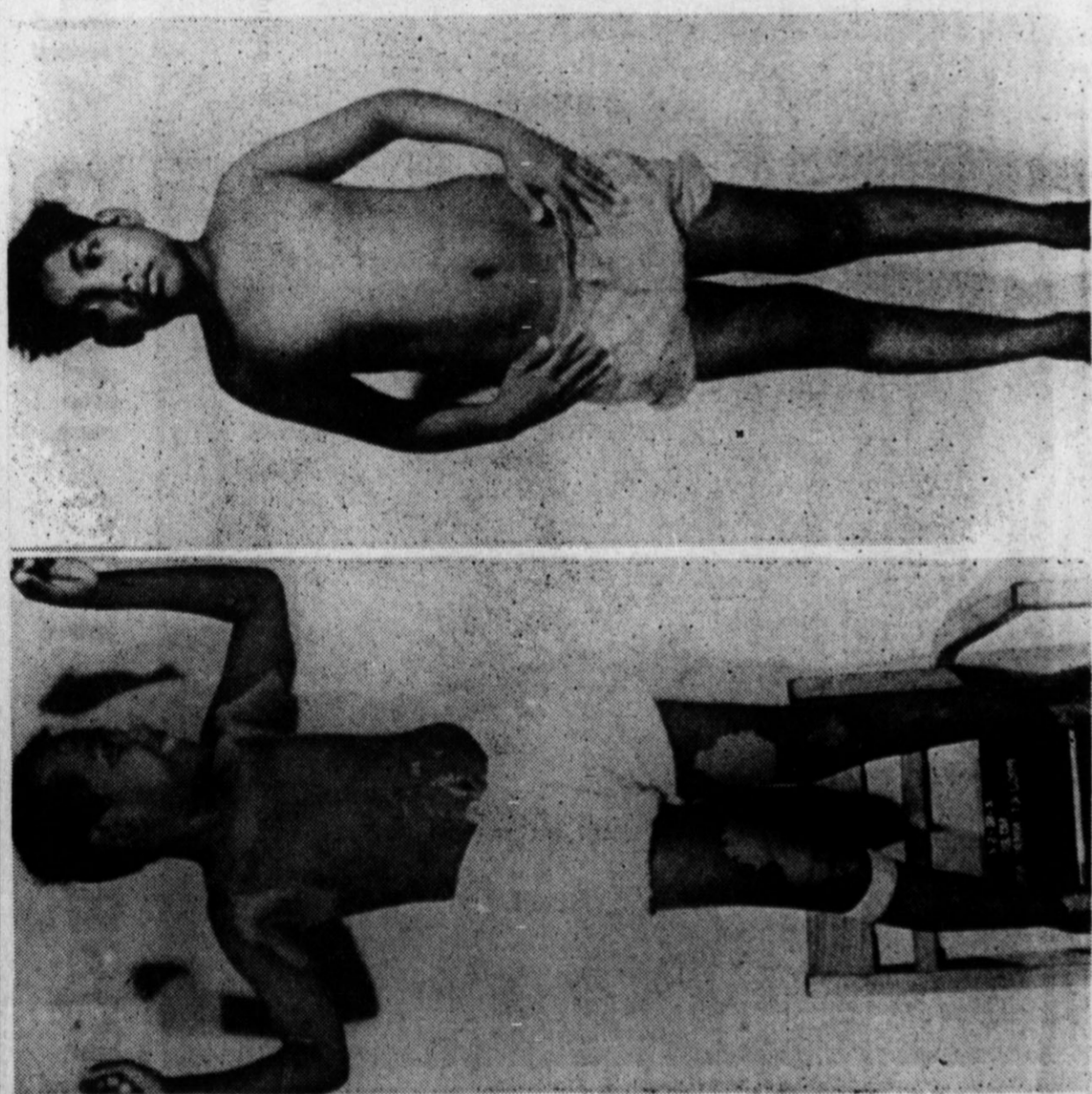
"Because some of our scientific understanding may prove to be wrong in a way that would produce much greater risks than we expect," the agency said, "future generations should be able to recover the wastes if they deem it essential."

If, as this suggests, the government is not at all certain about what will happen to the largest concentration of lethal waste ever placed in one location underground, that is only in keeping with what it does not know about the health effects of food and water spiked with radioactive waste.

Back in May 1978 during a hearing conducted by a House Appropriations subcommittee, L. Joe Deal, then assistant director of the division of operational safety in the U.S. Department of Energy, was asked why internal radiation levels of some Marshall islanders were lower than others.

Said Deal:

"I am at a loss to answer that unless the possibility exists that some of them didn't eat as many coconuts or drink as much coconut milk."



A BOY FROM RONGELAP, exposed to fallout from a March 1954 bomb test, posed for pictures that the government distributed to show how little harm was done. At left, he shows radiation burns and hair loss; at right, they drank coconut milk and well water and ate coconuts, breadfruit, papaya, sweet potatoes, pumpkins, arrowroot, and pandanus — all grown on the atoll — as well as fish.

A BOY FROM RONGELAP, exposed to fallout from a March 1954 bomb test, posed for pictures that the government distributed to show how little harm was done. At left, he shows radiation burns and hair loss; at right, they drank coconut milk and well water and ate coconuts, breadfruit, papaya, sweet potatoes, pumpkins, arrowroot, and pandanus — all grown on the atoll — as well as fish.

A Marshall Islands political leader told a House Appropriations subcommittee in May 1978 that "we were assured all along, first by the Atomic Energy Commission, then the Energy Research and Development Administration, and now the Department of Energy, that there were no serious radiation problems on Bikini."

In truth, the freshly planted coconut trees and other food crops had absorbed the cesium 137 and strontium 90 wastes buried in the soil from the nuclear tests. The fish from the nuclear tests. The well water was contaminated.

Within four years, internal radiation levels among the islanders ranged from 70 to 980 millirems annually. The upper level represented a 342 percent increase from 1974.

The growing internal radiation doses absorbed by the men, women and children living on the island came from eating food and drinking water spiked with radioactive waste.

Some comparisons are worth noting. Present government standards in this country suggest that each

person in the population should be exposed to no more than 170 millirems a year.

The average American receives about 100 millirems annually from natural background radiation. Depending upon which group of scientists is speaking, that causes no health damage whatsoever, it results in about 5,000 cancer deaths annually, or it produces about 15,000 cancer deaths each year.

Although the federal government's own medical surveys showed the level of radioactivity rising in the islanders' bodies, it ignored the findings and contended that everything was normal on the island paradise.

The Department of Energy, the successor to the Atomic Energy Commission, especially maintained that there was no cause for concern. The Interior Department felt otherwise.

Suspecting that the island was not as safe as the experts claimed, the Interior Department began shipping in drinking water and surplus foods to augment the islanders' diet. Still, the radioactivity levels in their bodies continued to build.

Finally, in 1978, the islanders who had returned to Bikini just four years earlier, who had gone home to a place that had been certified as

**FOREVERMORE,
Nuclear Waste in America**

The lethal legacy of a 40-year failure

By Donald L. Barlett and James B. Steele
Inquirer Staff Writers

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The evidence of 40 years of failure can be found in hundreds of locations scattered across America.

It is in two tanker trucks buried in trenches in rural Barnwell, S.C., inside a temporary inflatable nylon dome at Idaho Falls, Idaho, and in simmering liquids in an underground steel tank in a farm valley south of Buffalo, N.Y.

It is in calm pools of water in dozens of communities from Wiscasset, Maine, to Humboldt Bay, Calif., piled up in warehouses from Brooklyn, N.Y., to Newport Beach, Calif., and dotted about an industrial park in Canonsburg, Pa.

It is stacked up in a 165-foot-tall concrete silo in Lewiston, N.Y., sitting in barrels in Laurel, Md., and Bethel Park, Pa., mixed through the rubble of a razed factory building in West Chicago, Ill., and loaded in trucks that crisscross the nation's highways.

No one knows how much of it there is. No one knows all the places it is stored.

And no one — numerous claims to the contrary notwithstanding — knows what to do with it. Not the government that encourages its production, not the industries that churn it out, not the scientists who created the processes that generate it.

It is radioactive waste, a singular catchall phrase for scores of the most deadly and long-lived toxic substances ever manufactured by man.

You can't see the radiation. You can't smell it. You can't taste it. But it is there and it is spreading across the American landscape.

And the worst is yet to come. For the era of runaway nuclear-waste production is just beginning, bringing with it the potential for an environmental nightmare without precedent.

Three decades ago, in 1950, radioactive waste from commercial use of the atom was counted in ounces. Today, it is counted in tons.

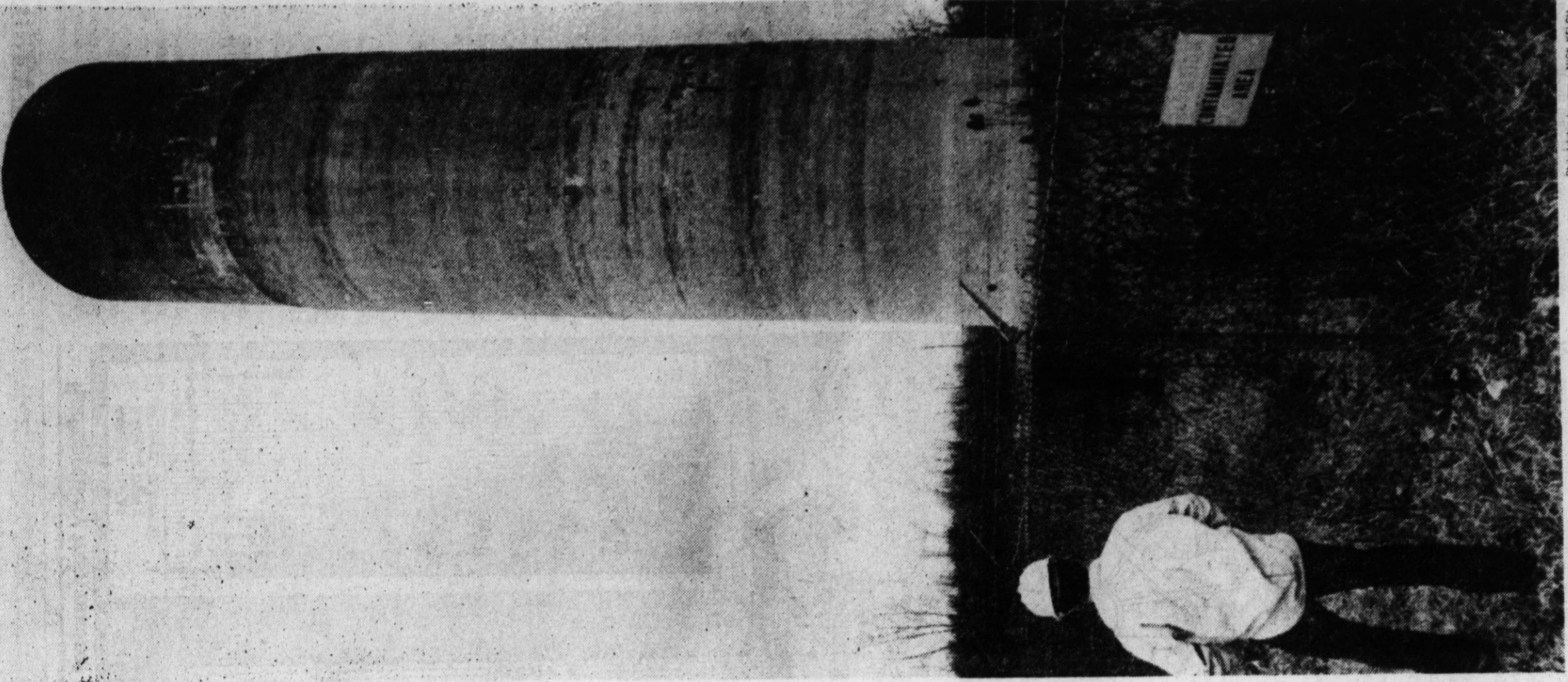
The curie level — a measure of radioactivity — of this garbage was counted in the hundreds in 1950. Today, it is

counted in thousands.

"I am at a loss to answer that unless the possibility exists that some of them didn't eat as many coconuts or drink as much coconut milk."

Counting the waste from the Manhattan Project, which produced the first atomic bombs in the 1940s.

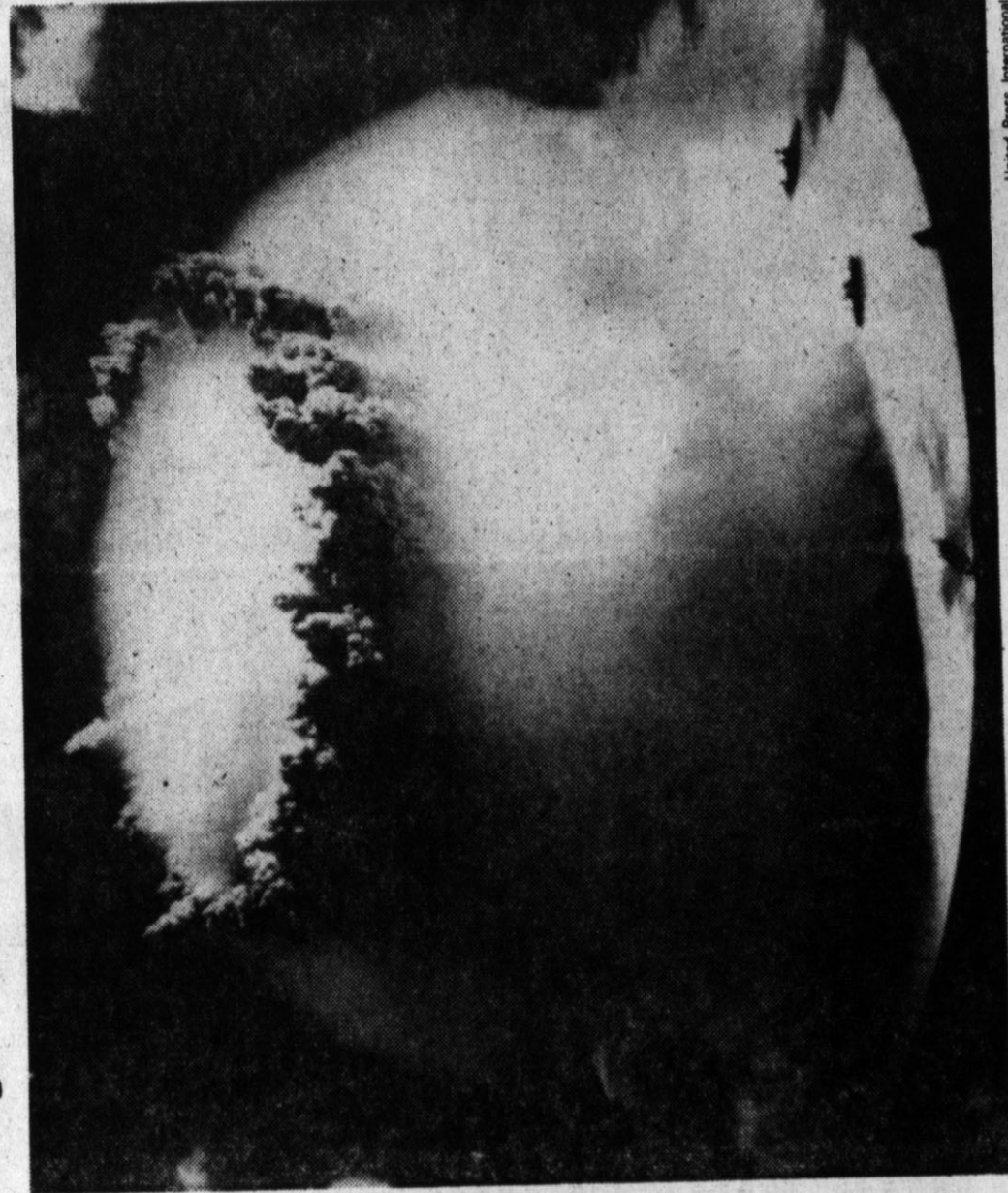
Inside this silo in Lewiston, N.Y., is radioactive waste from the Manhattan Project, which produced the first atomic bombs in the 1940s.



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Nuclear Waste in America

The deadly fallout of U.S. mistakes

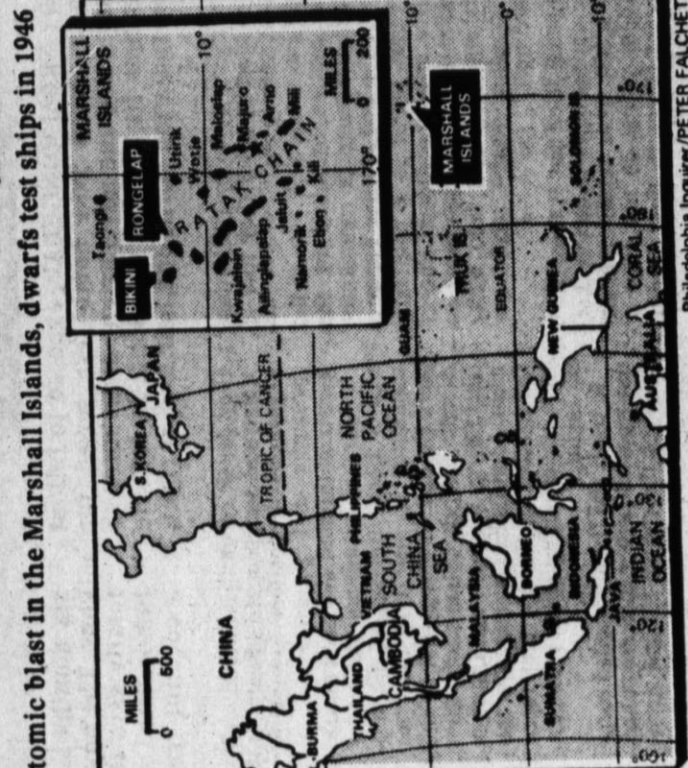


A dome of water, formed by an atomic blast in the Marshall Islands, dwarfs test ships in 1946

entirely heated," the AEC said in January 1955. Two years later, in January 1957, the commission reported, "The success of the commission's efforts to protect people against radiation originating in its programs is best evidenced by its record: ... The group of Marshall Islanders exposed generally were in good health and nutritional condition, and none of the clinical findings of a checkup in March 1956, with the exception of four cases showing various amounts of skin damage, could be attributed to the effects of radiation.

In July 1957, the commission told Congress that "preliminary data indicated that there were no illnesses or clinical conditions encountered which could be related to radiation effects. ... There was no evidence of any malignancy." Examination of a half-dozen islanders, the AEC reported showed that the amount of radioactivity in their bodies was "well below acceptable tolerance levels. To further allay any concern, the AEC contrasted readings on one island, Rongelap, with the prevailing standards in the nuclear industry. The commission stressed that the residents of Rongelap were exposed to less than 30 millirems per week, while "standards established for normal atomic energy activities" in the United States allowed workers to receive 300 millirems per week — 10 times as much radiation.

Five years after the bomb test, the AEC continued to express its satisfaction with the physical well-being of the Marshall Islanders. "The people were found to be generally in good health and their nutrition was satisfactory," the commission told Congress in January 1959. The AEC allowed that while "a few residual changes from beta burns still were apparent in the skins of some people ... there has been no outward evidence of any radiation effects."



Islands is but a tiny fraction of the now in temporary storage in the United States. Even worse, the scientific and political reasoning that contributed to these and other errors remains a part of the nation's nuclear-waste planning today, planning intended to lead to construction of the first high-level radioactive waste repository. And still worse, the federal government's frequent public pronouncements that it knew what it was doing and that all was well — when it did not know what it was

reality already has been demonstrated with tragic consequences in the Marshall Islands, whose residents were exposed to waste from U.S. nuclear weapons tests. Their story of being moved around the South Pacific like a homeless tribe and their subsequent health problems have been documented in congressional hearings and related in newspaper and magazine articles. Less well known are the scientific mistakes — made first in the 1950s, repeated in the 1970s — that led to the islanders' plight. Mistakes that the federal government pretended never happened.

Experts in the scientific community and government erred when they assumed that the radioactive waste left over from the weapons testing was harmless. They erred when they assumed that they knew how it would behave when it settled into the earth. They erred when they assumed that little of it would find its way into the food chain. They erred when they assumed that they could say precisely how much radiation the islanders would absorb. They erred when they assumed that they could remove the waste from the islands and make them fit for human habitation.

All this is waste from the defense program — which is much less radioactive than commercial nuclear waste and easier to process. That's the good news. The bad news is that defense waste accounts for only 11 percent of the radioactivity in all nuclear garbage generated in the United States. Commercial nuclear waste — mostly millions of used fuel rods stored at power plants — accounts for the other 89 percent. To compound the problem, production of commercial radioactive waste is a growth industry. It will continue to pile up even if not a single new nuclear power plant is proposed. That's because, barring an unforeseen wholesale shutdown, waste will flow without interruption from the 77 reactors in operation now and the two dozen or so that are nearing completion and are still expected to go on line. During the 1980s, businesses and institutions will spew out twice as much atomic garbage — measured in terms of radioactivity — as they produced in the previous three decades combined.

And that waste will continue to be stored "temporarily." Thirty years ago, the federal government, under persistent prodding by Congress, encouraged the growth of the commercial nuclear establishment with this understanding: Pending discovery of a safe and permanent solution, radioactive liquids that would remain deadly for thousands of years would be stored in tanks whose life span was uncertain, but probably limited to less than 50 years. In the event that the discovery was not made in 50 years, or before the first tank leaked whichever came first, the liquid waste would be transferred to a new set of tanks. This practice, a sort of radioactive musical tanks game, was to continue — as it does today — until the ultimate solution turned up.

They said that radiation's effects were well known, and that the little doses some people received from nuclear debris would never hurt them. The people died. They said that decisions on the handling of radioactive waste would be based on the best scientific evidence available. They based those decisions on political considerations or, sometimes, economic expediency. They said that legislation enacted by Congress would solve all the problems of nuclear waste. It solved none and created new ones. They said that the 50 states were better equipped than the federal government to manage certain types of radioactive waste, that they could work among themselves to forge a solution. They are not and they cannot, and now there is unprecedented political warfare among them.

Some measure of the seriousness of the problem, now and in the future, can be found in the government's makeshift handling over the last 40 years of just one form of radioactive waste — that generated from the manufacture of nuclear weapons. It is stored temporarily in 169 underground steel tanks, each with a capacity of from 500,000 to one million gallons, at the Hanford Reservation, a federal nuclear installation near Hanford, Wash. It is also stored temporarily in more than 100,000 55-gallon barrels stacked one atop another at the National Engineering Laboratory in Idaho Falls, Idaho. It is also stored temporarily in 50 underground steel tanks, each with a capacity of from 750,000 to 1.3 million gallons, at the Savannah River Plant near Aiken, S.C., another federal nuclear installation. Although some of this waste actually dates back to the building of the first atomic bombs 40 years ago, it is still in "temporary" storage. Federal officials have yet to develop a permanent storage system. And they have yet to convert millions of gallons of the waste from liquid to a solid form that will remain stable for the thousands of years it must be isolated from man and the environment.

It would pose no health hazard because it would never move. It moved. They said that liquid radioactive waste could be put in storage tanks, and that rigorous safety systems would immediately detect any leaks. The tanks leaked for weeks and no one noticed. They said they had developed an advanced system for reprocessing the fuel from nuclear reactors, so that much of it need never be stored at all. It did not work. They said that used fuel rods would never be allowed simply to accumulate indefinitely at the ground, like garbage in a landfill, and that

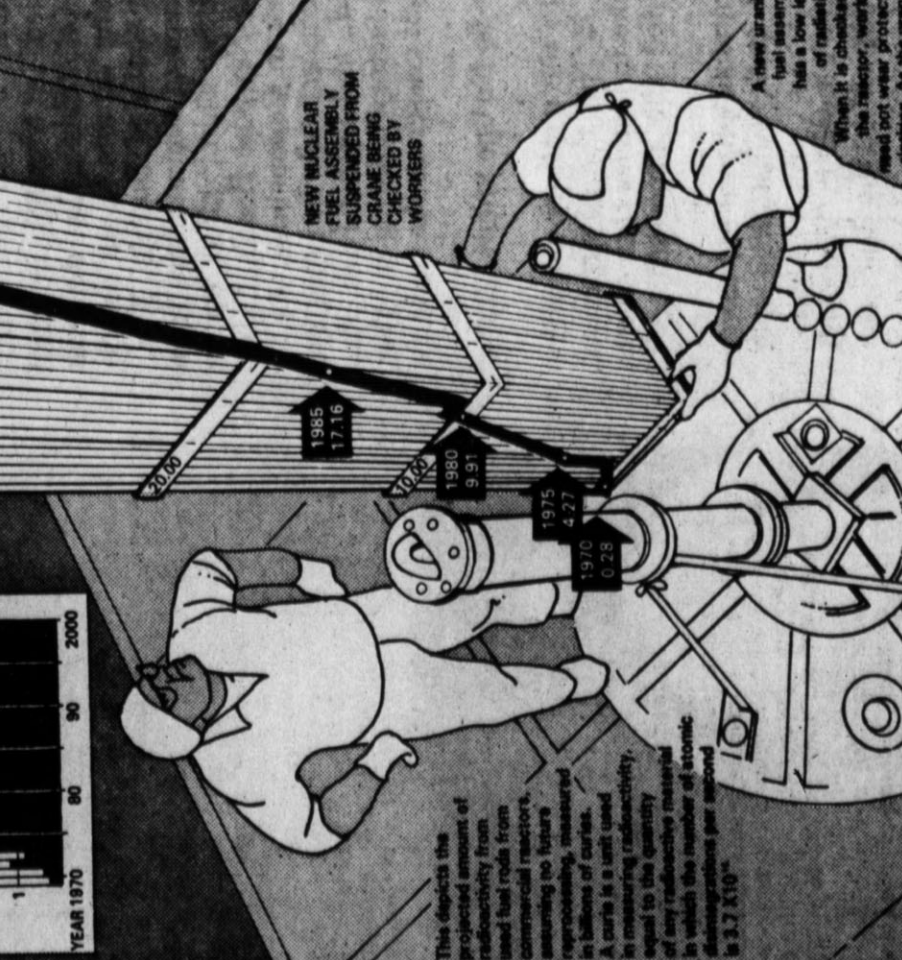
They said that science had most of the answers, and was on the verge of getting the few it did not have, for dealing with radioactive waste permanently. It did not, and it does not. They said that some of it could be buried in the ground, like garbage in a landfill, and that

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counted in the billions. Commercially generated radioactive waste temporarily stockpiled in dozens of casks kills more than 11 billion curies — enough to kill every American. By the turn of the century, it is expected that the accumulated radioactive waste will total 42 billion curies — enough to kill everyone on the face of the earth. Despite this inevitable buildup, an 18-month inquiry investigation has found again and again that public and private institutions have failed to come to grips with nuclear waste. So chaotic are government's and industry's attempts to deal with the relentless growth of lethal radioactive garbage that: ... All efforts to find a permanent method of managing the growing mountains of used fuel rods from nuclear power plants have failed. ... A new government policy dictates that nuclear-waste burial grounds be established in unsafe locations — guaranteeing that new dumps will be added to the list of those already closed as radioactive failures. ... One man has traveled across the country for 20 years setting up nuclear dumps near small towns and then moving on to roll in first radioactive garbage being on to roll in. ... Congress has created a bureaucratic maze to regulate nuclear waste so that no one agency can ever be held accountable for the end-less mistakes. ... And — no matter what you have been told to the contrary — industry, science and the medical community have been proved wrong time after time when they have claimed that radiation-exposure levels were harmless.

It was not supposed to end this way, with ever-growing stores of deadly material that no one knows what to do with. When the commercial nuclear industry was launched in the 1950s, government, business and science all promised that a solution would be found for radioactive waste. In a time of euphoria over the wonders of the atom and the promise of cheap, clean and abundant nuclear power, there were few words of caution. "The public should know," said Rep. Chet Holt (D, Calif.) in January 1959 that "this is a field where a permanent solution has not been found ... that the problem of permanent disposal of high-level waste has not been solved." Indeed not. It was as if the National Aeronautics and Space Administration had launched America's first orbiting spacecraft, Friendship 7, on Feb. 20, 1962, with the understanding that astronaut John Glenn would continue to circle the earth until NASA worked out the technology to bring him down. If the politicians and scientists in charge of nuclear-waste management had been running the space program, Glenn would still be orbiting the earth today. When the final chapter is written on the great waste debacle, it may well go down in history as one of the largest, if not the single largest, scientific and political blunders of the 20th century. It will be years, decades actually, before the toll from the government's failure to control radioactive waste can be tabulated, but a preliminary accounting suggests this much: ... Nuclear waste will be stored for up to a century — if not forever — in as many as 200 cities and towns across the country. ... Chunks of real estate will be rendered permanently uninhabitable in some states and placed off-limits for much of the 21st century in others. ... Tens of billions of dollars will be spent to correct mistakes of the past and prevent a massive financial burden that will have to be borne by future generations. ... Even worse, if past and present waste-management failures are repeated in the years to come, it is reasonable to assume that an as-yet unknown number of Americans will develop birth defects, cancer or other diseases. This assessment may prove overly optimistic. For perhaps in no other area of modern tech-



NEW NUCLEAR FUEL ASSEMBLY SUSPENDED FROM CRANE BEING CHECKED BY WORKERS. A new uranium fuel assembly has a low level of radiation. When it is checked in the reactor, workers need not wear protective clothing and need not be shielded from the radiation.

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Two non-radiographic employees had used the instrument and, instead of returning it to a sealed vault, had left it in the company dark room. Another employee unwittingly sat next to the radioactive material for two hours, doing paperwork.

That employee received a radiation dose estimated at 198 rems, enough to produce immediate physical effects — a melanoma in one eye, pain in the legs and buttocks, a reduced sperm count and chromosome changes.

Another employee received an estimated dose of 75 rems. Two dozen others received exposures ranging from 0.9 to 4 rems.

All these incidents, of course, were reported to the NRC. No one knows how many go unreported or unnoticed. But there seems little doubt that some companies are not eager to report their mistakes.

In Phoenixville, Pa., for example, a company initially did not report a radiation incident to the NRC, though it eventually wound up doing so.

An employee of Automation Industries Inc., a nuclear-material-handling subsidiary of GK Technologies Inc., discovered an abnormal growth under his right thumbnail in the summer of 1980.

The condition worsened over the next several months, "with swelling, bleeding, sensitivity and cracking" of the thumbnail, according to the NRC report. About the same time, a second employee began to develop similar symptoms.

The two men suspected that their job might be the cause. With their bare hands, they used pipe cleaners to remove radioactivity from contaminated industrial radiography sources.

Responding to their questions, a plant manager conceded that the abnormal growths could be work-related. Nonetheless, the company failed to acknowledge the need for medical attention. Instead, a third man was assigned to the radioactive cleanup work.

After an NRC inspector visited the plant in January 1981, Automation Industries advised the commission that all three employees had received radiation doses far in excess of federal standards.

The NRC subsequently estimated the cumulative doses for the three through 1980 at 25,000, 7,000 and 1,000 rems respectively. Those doses, if applied to the whole body instead of isolated in the fingers, would have been fatal.

The NRC imposed no fines or penalties in the case.

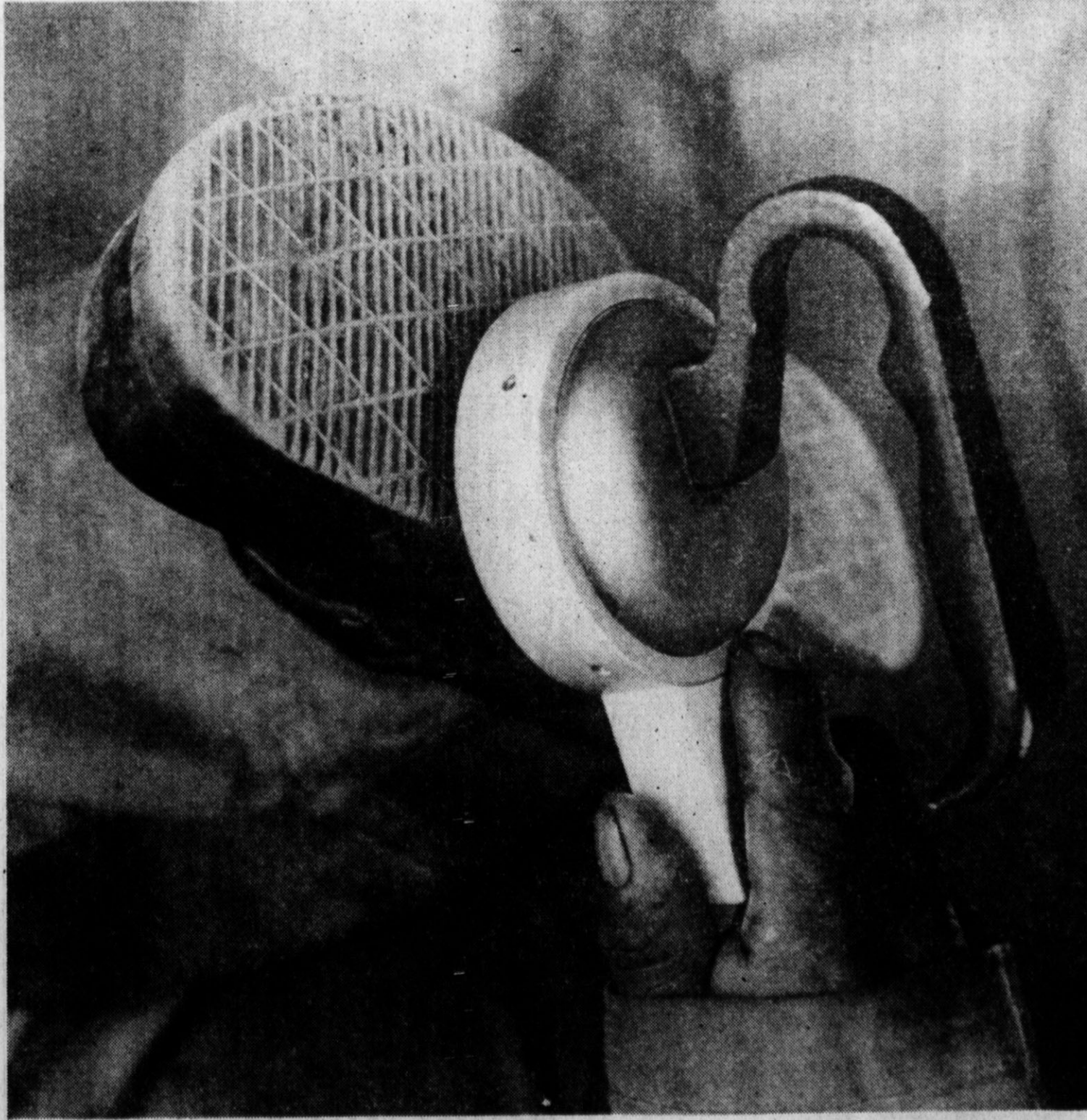
The undisputed risk: Genetic damage to future generations

As the number of people exposed to radiation grows each year, the risk for future generations, in the form of potential birth defects and other genetic abnormalities, rises accordingly.

More than a quarter-century ago, the National Academy of Sciences warned of the possible consequences of spreading radiation among a large percentage of the population. Said the academy:

"For the general population, and in the long run, a little radiation to a lot of people is as harmful as a lot of radiation to a few, since the total number of mutant genes can be the same in the two cases."

That assessment remains unchallenged today. Even those who discount any link between low-level radiation and cancer acknowledge that the genetic question is more murky



Philadelphia Inquirer / NICK KELSH

A truck driver checks his boot for radioactivity after delivering a load of nuclear waste to the Barnwell dump

Dr. Leonard A. Sagan, program manager for radiobiological and medical efforts for the Electric Power Research Institute, a research arm of the electric-utility industry, told House Science and Technology subcommittees in June 1979:

"We are not nearly so able to calculate the genetic risks as we are physical risks." That is one of the reasons that Dr. Edward P. Radford, an epidemiologist who was then with the Graduate School of Public Health at the University of Pittsburgh, wrote a strongly worded dissent to a 1980 National Academy of Sciences report that found no reason to change the current permissible radiation dose of 5 rems.

He suggested that the permissible dose be 1 rem a year for workers between 35 and 50, and 2 rems for those over 50.

This is just the opposite of what has been happening generally under existing industry practices, in which younger workers have received the larger doses of radiation.

Other scientists, physicians and government officials believe that the 5-rem permissible dose is perfectly adequate. They have said so in appearances before congressional committees, in government reports, in scientific papers and in medical literature.

Government and industry officials foresaw this when they chartered the country's nuclear course in the 1950s. Some ignored it. Others accepted, on blind faith, the scientific community's promise of a swift remedy.

At a hearing of Congress' Joint Committee on Atomic Energy in February 1959, Herbert M. Parker, a General Electric Co. official in charge of managing the defense waste at Hanford, expressed confidence that a technology would be developed to solidify the radioactive liquids.

Declaring that the steel tanks would safely contain the waste for the next 40 years, Parker told the committee:

"That superior methods, such as binding of wastes in ceramics, or other more permanent forms of retention, will not be in place, and in place economically in the next 40 years, is inconceivable."

Welcome to the inconceivable world of radioactive waste.

Government's answer: A plant Columbus should have built in 1492

In the quarter-century since General Electric's Parker, who spoke for many in government and scientific circles, predicted a permanent storage system, the state of American nuclear-waste management has remained essentially unchanged.

About all that has changed is the volume of the waste — and the level of radioactivity in it. Both have grown unremittingly.

And that includes both "low-level" and "high-level" waste. What the government calls low-level waste ranges from mildly contaminated laboratory equipment that will be harmless after a few weeks or months to sludge from reactors that will remain hazardous for several hundred years.

High-level waste includes the used fuel rods from nuclear power plants and the leftover liquids from reprocessing the rods. The material is all lethal and will remain so for thousands of years.

From 1960 to 1982, the volume of low-level nuclear waste buried yearly climbed from less than 50,000 cubic feet to 2.7 million cubic feet — an increase of 5,300 percent.

During the same period, the radioactivity level, measured in curies, of used fuel rods produced yearly went from zero to 6 billion. Meanwhile, the rhetoric of those responsible for nuclear waste has taken a new tack. Instead of promising that a solution will be found, they insist that it already is in hand.

Over and over again, members of Congress, officials of federal agencies, industry executives and scientists have asserted that the technology now exists for permanently managing radioactive waste.

In January 1980, the National Academy of Sciences, a quasi-governmental organization of scientists and engineers that examines science-related issues for federal agencies, reported:

"No insurmountable technical obstacles are foreseen to preclude safe disposal of nuclear wastes in geological formations. All necessary process steps for immobilizing high- and low-level wastes have been developed, and there are no technical barriers to their implementation."

In October 1981, Shelby T. Brewer, assistant secretary for nuclear energy in the U.S. Department of Energy, told a House Interior and Insular Affairs subcommittee:

"Contrary to a sizable fraction of public belief, we already have the technology in hand or under development for safe disposal of

nuclear waste." In March 1983, Philadelphia Electric Co., in a report to stockholders, quoted the president of the Atomic Industrial Forum, the nuclear-industry trade association, as saying:

"Science has long known what the technical problems of waste management are and more than 25 years ago began developing a technology to deal safely with them. What's been missing until now, however, has been the political will to let science get on with the job."

So how goes the technology for nuclear-waste management that has been well in hand for years and that science has been waiting impatiently to implement?

Consider what for more than two decades has been hailed as the perfect answer: solidification. From the dawn of commercial nuclear power in the 1950s, government plans called for the used fuel rods from nuclear power plants to be treated in a reprocessing facility.

There the rods would be dissolved in a chemical bath; reusable uranium and plutonium would be recovered; and the remaining highly concentrated radioactive liquids would be converted to solid form and taken away for storage in an underground repository.

In January 1966, the Atomic Energy Commission reported that, in laboratory experiments, "high-level radioactive waste has been solidified in stainless steel containers 12 inches in diameter and eight feet long."

"The conversion to a solid offered a much improved form for long-term storage land reduced the volume by approximately tenfold."

By the 1970s, government accounts of the marvels of solidification had taken on the same self-assured tone that characterized most reports on radioactive-waste management. In its 1972 annual report to Congress, the Atomic Energy Commission said without qualification:

"From the outset, the wastes from commercial fuel processing will be treated by proven solidification processes yielding small volumes of waste contained in sealed canisters."

By 1975, federal officials had calculated the precise volume of liquid waste to be solidified each year, and the area required to store it. Frank P. Baranowski, director of the Division of Nuclear Fuel Cycle and Production in the Energy Research and Development Administration, a forerunner of the Department of Energy, presented estimates to the Joint Committee on Atomic Energy in November 1975.

Baranowski said that "the cumulative high-level waste from nuclear power in the year 2000 would fill a football field to a depth of about eight feet."

In November 1978, the Energy Department reported that "the technology for processing waste into glass is advanced in the United States. Since 1966, over 50 million curies of radioactive materials have been incorporated into glass at Pacific Northwest Laboratories in a series of demonstrations" at the government's Hanford Reservation.

The numbers sound impressive. But at that rate, if the used fuel rods now in storage at nuclear power plants were reprocessed, it would take more than 2,500 years to solidify the leftover radioactive liquids.

Of course, the solidification effort at Hanford was carried out on a laboratory level. A commercial facility would operate on a production-line scale. Radioactive waste in a solid form would roll out of such a plant like cars off a General Motors assembly line.

That, at least, is the scenario painted by the experts. The scenario is a fantasy. There never has been such a facility in the United States. In fact, there has been only one in the free world, a vitrification plant at Marcoule, France. It is operated by Cogema, a company established by the French Atomic Energy Commission to handle France's atomic energy program.

Cogema describes Marcoule's technology as "the only high-level waste solidification technique that is backed by more than 25 years of

research and development. 20 years of pilot testing and five years of actual operating performance under commercial conditions. The plant, which started up in 1978, has been cited time and time again by nuclear proponents in Congress, the federal energy bureaucracy, science and industry as an example of state-of-the-art technology.

The rhetoric, though, is far more persuasive than the reality. This position runs counter to the accepted French wisdom and files in the face of pronouncements by the U.S. Department of Energy and National Academy of Sciences that such waste may be stored safely in an underground repository forever.

Handling a nuclear leak: You can blow it up, or you can bag it

If the 40-year quest for technology to solidify high-level radioactive waste does not sound promising, consider another problem: shallow land burial of low-level radioactive waste.

Since the early 1960s, most of the low-level waste generated in the United States has been buried at six commercial dumps.

At one, a 20-acre nuclear graveyard near Sheffield, Ill., 125 miles west of Chicago, burial trenches holding 3.1 million cubic feet of radioactive waste have been collapsing.

Opened in 1967, Sheffield closed in 1978 after radioactive tritium, one of the materials buried in the trenches, showed up in nearby wells.

From the late 1970s on, Sheffield's nuclear graves — some of them 25 feet deep, 55 feet wide and 400 feet long — have been, as the Nuclear Regulatory Commission (NRC) puts it, "subsiding." Large depressions and holes have appeared in 15 of 21 trenches, exposing once-buried radioactive waste.

At one trench, records show that at least 15 depressions and holes — some 10 feet deep — occurred over a 13-month period in 1979-80. Water also began to collect in the trenches.

The operator of the site, Nuclear Engineering Co. Inc., now US Ecology Inc., was required by court order to pump water out of the most seriously affected trenches. In the meantime, radioactive tritium continued to leak out and contaminated adjoining land.

As the trenches deteriorated, the NRC began to explore what might be done to halt the process. The agency commissioned a report in 1980 that in turn set forth several possibilities. Under a heading entitled "Trench Stabilization Techniques," the report suggested that any of the following might be employed:

- "Dynamic consolidation"
- "Pile drivers and compaction piles."

Roughly translated, these involve dropping giant weights on the nuclear graves, driving timbers into the earth to shak up the burial ground, or just blowing it up with dynamite.

The report explained each technology. First, dynamic consolidation.

"The method involves dropping five- to 40-ton weights from heights of 20 to 100 feet according to a predetermined pattern evaluated for the particular site. A high-capacity crane is employed to lift and release the weight, which is dropped several times at one location before moving on to the next impact location."

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The group feels that any decision of principle calling ultimately for such irreversible burial would be premature in the current state of our knowledge.

Stripped of its polite phrasing, the Castaing Report says that high-level nuclear waste, which will remain lethal for centuries, must not yet be buried underground because no one can be sure exactly what would happen to it there.

This position runs counter to the accepted French wisdom and files in the face of pronouncements by the U.S. Department of Energy and National Academy of Sciences that such waste may be stored safely in an underground repository forever.

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Nuclear Waste in America

Nuclear Waste in America

This happened because hospital workers routinely injected patients with double the prescribed dose of technetium-99m, a radioactive agent used in scans of the brain, bone, liver, spleen and lung. The workers did so in order to reduce screening time and obtain brighter images, and then falsified hospital records to indicate that the correct dose had been given.

In Oklahoma City, an employee of Mustang Services Co. was removing a gauge containing 1.5 curies of cesium 137 from a trailer that was being sold. During the process, the cesium fell out of the gauge — a tool used to measure the thickness of pipe walls — and rolled unnoticed into a recess in the trailer floor.

Several days later, an employee of the trailer's new owner began driving it to Houston. He stopped in Norman, Okla., for engine repairs, and in Ardmore, Okla., for fuel.

The driver received a dose estimated at 1.4 rads before the cesium dropped through a hole in the trailer floor onto a bridge near Lewisville, Texas. It came to rest on the bridge's structural support, where it was later found with radiation detection equipment.

In Corpus Christi, Texas, about two dozen employees of Weatherby Engineering Co. received radiation doses when they were unknowingly exposed to a radiographic device that contained 72 curies of Iridium 192.

Trials from equipment associated with their jobs. And sometimes the victims are exposed without their knowledge.

A random sampling of such incidents, compiled from NRC reports, offers some measure of the growing problem.

In Eveleth, Minn., several workers at the Eveleth Expansion Co. were exposed to radiation from a control gauge that contained 10 curies of cesium 137.

The gauge was inside an iron ore pellet cooler. When a protective lead shield surrounding the cesium melted and no one noticed, workers in the area received an estimated exposure of up to 3 rems.

In an accident in the Gulf of Mexico, near Intercoastal City, La., a radiographer for Analytic Inspection Inc. of Lafayette, La., and the captain of a barge received radiation doses estimated at 10 to 25 rems. The captain's helper received two rems or less.

The accident occurred when the barge tilted and a radiographic device containing 11 curies of cobalt 60 broke loose on the deck, rolled under a pump assembly and was sheared open.

In Wauwatosa, Wis., patients at Lakeview Hospital received excessive radiation doses up to 840 millirems when they underwent diagnostic screenings. (Exposure from an X-ray is normally between 20 and 50 millirems).

arm in November 1980. Physicians interviewed by the NRC dismissed this account, saying that by the look of the injury, exposure should have occurred in the late December 1980 or early January 1981, the period during which the radiographic device was reported missing.

Whatever the truth, the NRC's attitude in such matters is perhaps best summed up in the conclusion of a report the commission issued just before Crofut's death:

"The event (Crofut's radiation exposure) is not considered an abnormal occurrence at this time since it has not been established that the radiation exposure resulted from material subject to licensing by the Nuclear Regulatory Commission... or the states.

Perhaps the larger question left unanswered by Crofut's death is how someone with an admittedly serious alcohol problem, someone with a string of arrests — including one for a jailbreak — came to be licensed to handle deadly radioactive material.

As the industrial use of measuring devices and other equipment containing nuclear materials continues to spread, an increasing number of workers are coming into contact with them.

Every year, numerous accidents occur in which people are exposed to radioactive mate-

crimes, checked into the Okmulgee (Okla.) Hospital. He was suffering from radiation burns over his upper body and left arm.

His left nipple was burned off. His bone marrow was destroyed. As Crofut's attorney described the injury, "this thing was just a horrendous, large, massive sore... kind of like a dinner plate above his breast and down into the bone. You could look in there two or three inches."

Physicians watched as the cells in Crofut's body degenerated "before our very eyes." Still, the NRC remained optimistic about Crofut's condition. In a report released early in July 1981, the commission stated:

"In late January, medical opinion was that the individual may have received a lethal dose of radiation. However, in May, the individual seemed to still be improving and his blood appeared to be nearly back to normal."

Crofut died on July 27, 1981, just after release of the optimistic NRC report.

The cause of death listed on the death certificate: "Multiple complications from radiation burns-accident." It was estimated that Crofut was exposed to between 356 and 405 rems.

To this day, neither the NRC nor any other federal agency knows how, where or under what circumstances Crofut received the lethal exposure. And for good reason. They never conducted a serious investigation.

Based on a limited inquiry, the NRC reported simply that its investigator could find "no hard evidence to explain the injury."

Instead, the commission contented itself with trying to link Crofut's exposure to the theft of a radiographic device from a truck owned by Bill Miller Inc. in Henryetta, Okla.

Miller had informed the NRC on Jan. 3, 1981, that the device, which contained 33 curies of Iridium 192, turned up missing during a quarterly inventory conducted on Jan. 2. The equipment was mysteriously, and anonymously, returned on Jan. 5.

There was no evidence to the Crofut to the theft, which remains unsolved. And there was no evidence to establish that he deliberately exposed himself to the radioactive material, as NRC probes himself.

To support their theory, the investigators quoted an anonymous neighbor as saying that Crofut once "was observed trying to get fire to himself by dousing gasoline over his body with a rag and then making an unsuccessful attempt to ignite himself with a match."

Another neighbor advised the NRC that Crofut had been seen "walking in the neighborhood at various hours of the day and night." Crofut's attorney in Okmulgee, Richard D. Gibbon, is quite blunt about the radiographer's past: "He drank a lot, he had a lot of problems and I think he had a bad reputation... as far as getting in trouble." But Gibbon doubts that Crofut purposely exposed himself to radiation.

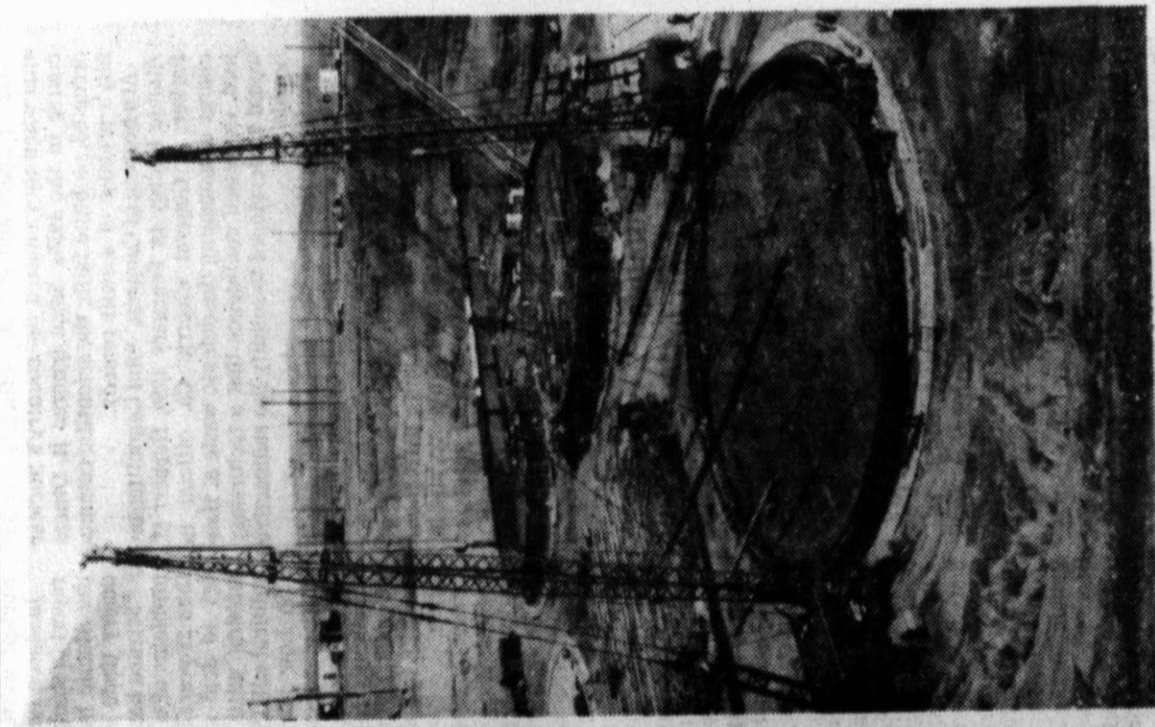
Gibbon said Crofut knew that the NRC was "inferring that he had stolen" the radiographic equipment, "but he denied it to me."

Although Crofut met with his lawyer only a few times before his death, Gibbon said he had a feeling that Crofut was "the type of old boy that had enough sense, I think, to kind of shoot straight with his lawyer, because I think he had been around a lawyer enough." Gibbon said he could imagine Crofut telling him something like "Yeah, I robbed a bank, but get me out of it."

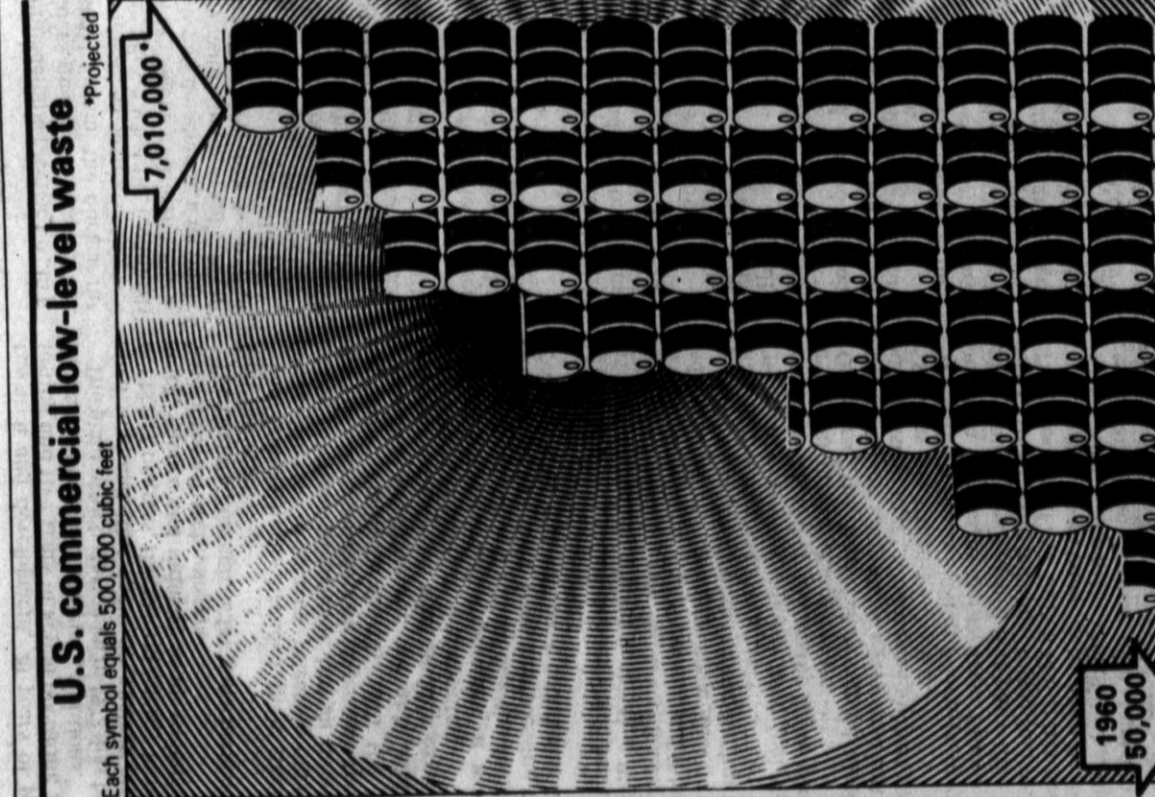
"But he never once gave any indication that he was involved to any extent, knew who stole the radiographic device, or anything. I questioned him very thoroughly in that area and he denied all that."

Gibbon said that Crofut believed he had received the radiation injury while working on a pipeline in New Mexico in October 1980. Some radiographic tools contain nuclear materials capable of causing such wounds if protective shielding were to fail.

Crofut told the same story to the NRC, saying that he noticed an irritation on his chest and



A TANK IN A PIT is readied for high-level liquid waste in this 1977 photograph at the Hanford Reservation in Washington state. Leaks were a problem for years.



Each symbol equals 500,000 cubic feet. *Projected. U.S. commercial low-level waste.

And well they might be. They must contain extraordinarily high levels of radiation. Depending upon how long assemblies have been out of a reactor core, exposure to them could be fatal in seconds or minutes.

On May 26, 1981, two assemblies were lifted from the storage pool at Morris and loaded into the cask. As was customary, the cask was decontaminated before the trip to make certain that the surface radioactivity was below the level required by the U.S. Department of Transportation.

The decontamination procedure involved washing and scrubbing the cask with detergents or abrasives to remove radioactivity. When the cask arrived the next day at La Crosse, the surface contamination — although below the maximum allowed by federal regulations — was still four times greater than when it had left Morris. No one had an explanation for the increase.

For the next shipment, on May 29, technicians again scoured the cask to remove radioactivity. Eight hours later, when the cask arrived at La Crosse, the surface contamination had increased sharply — up 136 times over the level when it had left Illinois, and 14 times greater than permitted by federal regulations.

At La Crosse, workers once again decontaminated the cask. A Nuclear Regulatory Commission report was confident that the new scrubbing efforts would succeed.

"(Dairyland officials) stated that the decontamination procedures would be exceptionally thorough and would include the use of additional decontaminating agents acetone and ammonia solution. These measures appeared successful in reducing the high contamination levels."

Nevertheless, when the tractor-trailer returned to Morris to pick up the third shipment

Source: U. S. Department of Energy. Philadelphia Inquirer/JOHNSTONE QUINN

of fuel assemblies, the cask once again showed excessive contamination. Now it was time for Morris to try its hand at decontaminating the stubborn cask. Workers used detergents and abrasives to reduce surface radioactivity to a lower-than-normal point. Said an NRC spokesman:

"They really cleaned it up." They also put it through a test to see if the reason for the contamination could be detected. The truck carrying the cask had passed through a violent storm on the second trip to La Crosse, and there was speculation that the rain might have agitated the radioactivity.

So Morris technicians simulated a rainstorm by spraying the cask with a fire hose, then waited eight hours to see if radioactivity levels rose. When they did not, the third shipment was sent on its way.

Despite these efforts, the cask arrived at La Crosse registering even higher levels of surface contamination than on previous trips. Readings now were 36 times greater than allowed by federal regulations.

The Nuclear Regulatory Commission asked Dairyland to postpone the fourth shipment and to keep the cask at La Crosse until "actions can be taken to ensure that contamination levels were reduced."

After a day of pondering the dilemma, officials of the federal government, the transportation company and the nuclear plant came up with a novel solution.

The 25-ton cask was wrapped in a sheet of polyethylene plastic. The Nuclear Regulatory Commission gave orders for a "chase car" to follow the truck, periodically take radiation readings and repair the plastic, if needed.

When the cask arrived at Morris, "no removable contamination was detected on the outer surface of the plastic cover," according to the

U.S. Department of Energy

These, then, are a few of the technologies for dealing with radioactive waste:

- Solidify high-level liquid waste with a French system that leaves it unsafe for burial and that is so slow it would take nearly 1,200 years to process the volume accumulated by 1990.

- Blow up low-level waste burial grounds to correct sunken trenches and stop radioactivity from seeping off the site.

- Put plastic bags around used-fuel transportation casks to halt the emission of radioactivity while the casks are traveling along the nation's highways.

- Nevertheless, the federal government insists that the technology to handle radioactive waste is very much in hand, that no new techniques are needed and that the only serious problem is the public's failure to recognize that everything is under control.

- The guarantees aside, the nation's record speaks for itself: Radioactive waste continues, after four decades, to be held in interim storage, awaiting implementation of a commercial-scale management technology that has yet to be proven safe or permanent.

- It is, to be sure, simplistic to say there is enough radioactive waste in storage to kill

FOREVERMORE,

The method involves driving wood piles, at close centers on a grid pattern, into the soil deposit to be densified. Penetration of the pile into the trenches and the accompanying vibratory effects of the pile-driving operation may cause voids and containers to collapse and compact the less dense trench backfill soil and waste materials.

- And, lastly, blasting
- Drive a pipe to the desired depth, usually two-thirds the thickness of the stratum to be densified.
- Lower an explosive charge to the bottom of the pipe.
- Withdraw the pipe.
- Backfill the hole.
- Fire charges.

The report acknowledged that these technologies, if applied, were not without risks. In the case of pile driving, "the penetrating equipment may puncture the containers and be exposed to the waste materials contained in them. Consequently, radioactive gases may be released."

In the case of blasting, "inherent in the blasting operation may also be the release of radioactive gases and worker exposure to these releases. The technique also requires strict control and expert personnel to handle the potentially dangerous material and operation."

Indeed it does. For while low-level waste burial grounds are frequently described as repositories for slightly contaminated items such as old gloves and laboratory coats, Sheffield's trenches also contain lethal radioactive materials.

These include 34 pounds of plutonium and 70 pounds of enriched uranium.

The plutonium would be inefficient, if distributed through the atmosphere in an explosion, to cause cancer or death in every American who breathed it.

If the scientific techniques proposed to take care of Sheffield seem a bit bizarre, consider next the technology already in use in another phase of the nuclear-waste business — the giant plastic baggie for the transportation of highly radioactive used fuel rods.

The plastic baggie was tested in 1981, when eight used fuel assemblies were shipped from the General Electric Co. plant in Morris, Ill., to the nation's smallest nuclear generating station, the La Crosse plant of the Dairyland Power Cooperative in Genoa, Wis., about 250 miles to the northwest.

The story, pieced together from Nuclear Regulatory Commission records and interviews with NRC and utility officials, goes like this: In 1979, La Crosse had run out of space in its storage pool for the used fuel assemblies that are periodically discharged from a reactor's core.

When the assemblies are removed, they are intensely hot and radioactive. To cool them and shield the surrounding area from radiation, they are submerged in a water basin resembling a large swimming pool.

While awaiting NRC approval to enlarge its pool's capacity, Dairyland was forced to find an interim storage site for eight used assemblies so that the plant could continue to generate electricity.

The General Electric facility at Morris which was built to reprocess used fuel rods but never operated, agreed to accept the assemblies temporarily and place them in its storage pool.

By May 1981, Dairyland had completed its pool expansion and was ready to take back the eight assemblies. Four trips would be required because only two assemblies could be transported at a time.

The assemblies were to be carried in a fail-safe metal cask that weighed 25 tons and was anchored on a flatbed tractor-trailer. Perfected after years of research and tests, such casks have been described by the Atomic Industrial Forum, the nuclear-industry trade association, as "the safest and most intensively designed shipping containers ever built by any industry."



Everyone at the Barnwell nuclear cemetery carries a dosimeter, which gives a radiation reading when held to the light.

FOREVERMORE

public attention on the radiation hazard in dial painting, systematically assembled medical evidence to prove the link between the radium-based paint and the dial painters' deaths.

During these years, despite a torrent of publicity about the deaths, the federal government and many doctors and scientists resisted all such findings. Years went by before these authorities finally accepted the dangers.

In 1933, the American Journal of Public Health reported in a dispassionate analysis exactly how much radium the young women consumed when they moistened the tips of their brushes on their mouths.

"Depending on their skill, the workers tipped the brush from one to 15 times per dial, and painted 250 to 300 dials per day.

"A worker who licked one microgram of paint from her brush four times per dial, 300 dials per day, five days per week, would therefore ingest about 4,000 micrograms of radium in six months.

"When fixed in the bones, as little as two micrograms of radium has been fatal."

Official concern grows, gradually, limits on exposure begin to fall

The general failure of the medical establishment to recognize the link between radiation exposure and the deaths of the dial painters was clouded by prevailing medical practices.

At the time, physicians themselves were entranced by the potential curative values of radiation, in the form of both radium and X-rays. They recommended both for treatment of a variety of non-life-threatening ailments.

As one doctor explained in a medical-journal article:

"There seems no question but that certain forms of gout, rheumatism, chronic arthritis and neuralgia can be greatly helped by its [radium's] use."

Radium-filled tubes were applied to the jaws of adults for up to 12 hours to reduce enlarged tonsils. (Children under 12 received about half the dose.)

If that did not work, radium-tipped needles were inserted directly into the tonsils for up to 90 minutes. And if that failed, the radium was implanted directly into the tonsils, although it was noted that this method "will result in a rather severe reaction."

Radium was used to treat women, even teenage girls, with prolonged menstrual cycles. Fears of possible sterility were dismissed as "unfounded."

And one medical team injected radium salts into patients in a mental institution to establish that radium would lower high blood pressure.

Much of the debate among doctors, it seems, centered not on any possible harmful effects, but on which source of radiation gave the best results — radium or X-rays.

As the 1920s gave way to the 1930s, and the death toll from radiation continued to mount — especially from radium-based paints and patent medicines — the federal government gradually recognized the need to set exposure limits.

Finally, in 1934, the Bureau of Standards, acting on the recommendation of a medical and scientific advisory committee, published its first guidelines to protect people who were

has remained constant for the last 27 years, might seem to suggest that experts in government, medicine and science now have all the answers, and that no further change need be considered.

In fact, all available evidence suggests that the major reason that the 5-rem level has not been reduced — as many believe it should be — is the economics of the nuclear industry.

When the 5-rem standard was agreed upon in 1956, most people who handled radioactive materials worked for the federal government. The private work force, outside of medical and educational institutions, could be counted in the hundreds.

Now the private work force numbers tens of thousands, and the ranks of nuclear workers in government, medical and educational institutions also have swelled dramatically.

In a report issued six years ago, the Bureau of Radiological Health, in the former U.S. Department of Health, Education and Welfare warned of the consequences of this trend.

"The greater the number of people exposed to low-level radiation," the bureau said, "whether from industrial applications, consumer products or medical sources, the greater the number who will suffer the long-term consequences."

The statistics for the atomic power industry offer some insight into the changing nuclear workplace.

As recently as 1970, only 2,661 nuclear power-plant workers were reported to have been exposed to measurable radiation, according to NRC records.

By 1981, the latest year for which figures are available, that figure had soared to 82,183 workers — an increase of nearly 3,000 percent.

During those years, of course, the number of nuclear reactors put into service also rose sharply, from 10 in 1970 to 77 today.

Still, only half the increase in the work force was attributable to the building of new plants. The other half resulted from the growing "dirtiness" — industry jargon for radioactivity — of power-plant jobs.

In 1973, NRC records show, 2,514 workers were exposed to 2 rems or more of radiation. By 1981, that figure had shot up 179 percent, to 7,014 workers.

More important, a total of 14,780 power-plant workers were exposed to measurable radiation in 1973. Their collective doses amounted to 13,963 rems.

That worked out to an average of 945 millirems for each worker, the highest level since the federal government began compiling statistics on individual exposures. (There are 1,000 millirems in one rem.)

By 1981, the 82,183 power plant workers exposed to radiation had received collective doses totaling 54,142 rems, up 288 percent from 1973.

That averaged out to 659 millirems per worker — a seemingly significant improvement over 1973's average exposure of 945 millirems. But the figure is misleading. In order to bring the average dose down, power plants recruited a larger work force to perform radiation-related tasks. In other words, they spread the radioactivity around to a greater number of people.

Historically, the federal government has dragged its feet in acknowledging any connection between radiation exposure and people's deaths — from the radium-dial painters in the 1920s to the residents of the Marshall Islands who were dusted by radioactive fallout in the 1950s to the Hanford Reservation workers today.

In many cases, the government neglected to inform employees of the potential risks of working in areas contaminated by radioactivity, and scores of workers who later developed cancer sued the government.

Although most say they were never told of the hazards they faced, some did at least know when they had been exposed to certain types of radioactivity.

How did they know? The government held a beer party for them. A beer party was the standard medical treatment for employees who ingested certain radioactive materials in the 1960s at the Nevada Test Site, where nuclear warheads were detonated.

It is the standard treatment in the 1980s at the federal Savannah River Plant near Aiken, S.C., where nuclear weapons materials are produced.

During legal proceedings in 1980, Keith L. Prescott, a 10th-grade dropout from Park City, Utah, who went to work at the Nevada Test Site in 1961 at the age of 35, recalled the beer-drinking sessions.

Prescott, who was permanently disabled in 1969 and was diagnosed as suffering from multiple myeloma, is one of the former federal employees suing the government.

During the early 1960s, he operated a muck-ing machine, scooping up debris in the underground tunnels that were carved out for bomb tests.

He and others sometimes returned to the mines within 24 hours after a nuclear explosion. He maintains, as do others, that they were never told the quantity of radiation they had received, but only that it was harmless.

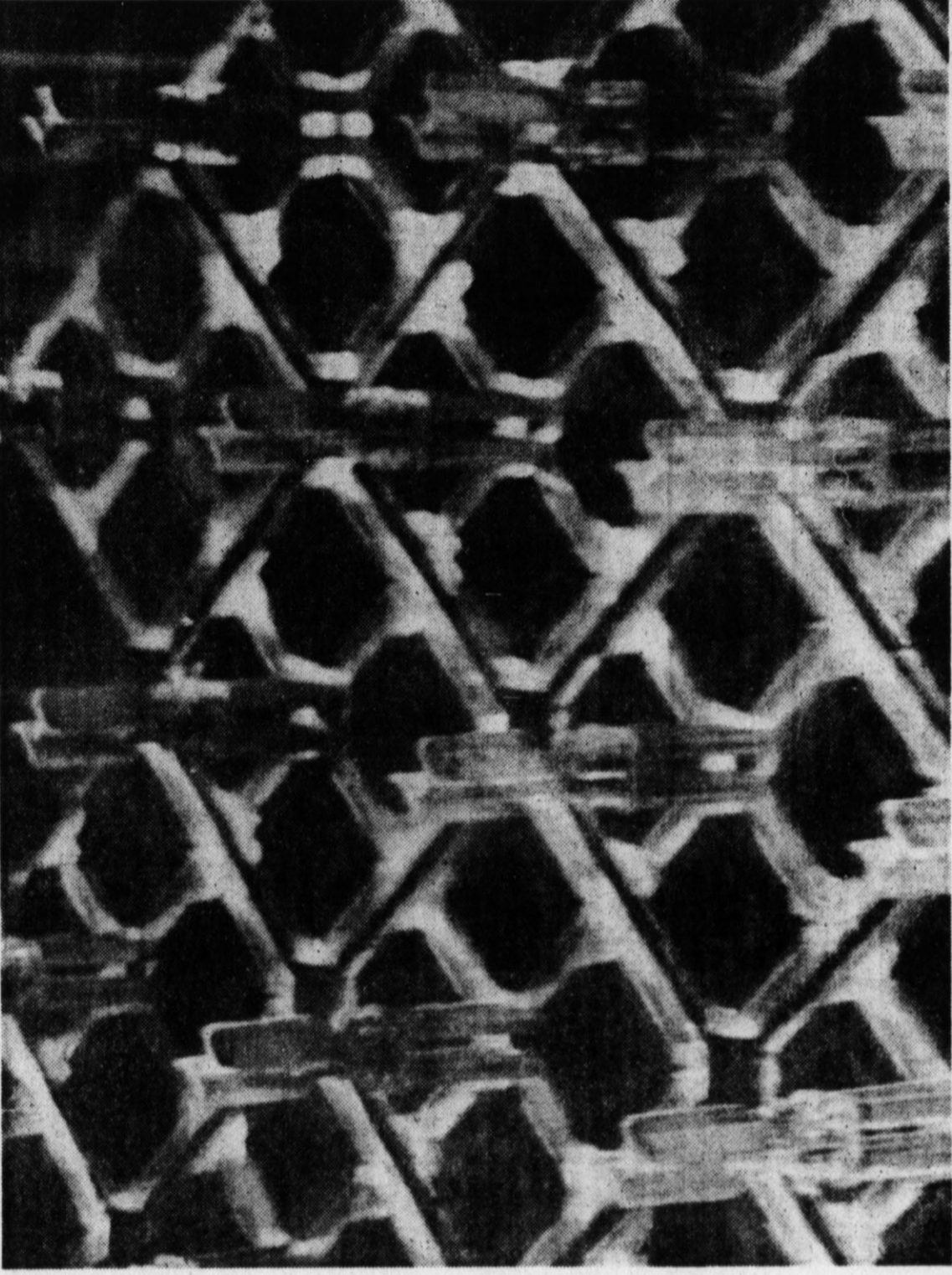
But they were encouraged, on occasion, to drink beer. "They'd have beer down at the change room," he said, "supervisors told us they wanted us to go down and drink all the beer we could because it helped flush out [the radioactive] particles...."

Prescott then had this exchange with an attorney: Do you remember who advised you to drink beer? Prescott: Our supervisors was the ones that told us... Just told us that there would be beer there and come and drink all we could.

Attorney: How frequently was the beer furnished? Prescott: Well, it was furnished quite often there for a time....

Nuclear materials in the workplace. Accidents do happen. The government, as it usually does, is denying that radiation had anything to do with the diseases suffered by Prescott and his colleagues. But sometimes radiation wounds show up that are so severe the government has little choice but to acknowledge them.

That was the case with Douglas Crofut of Henryetta, Okla. On Jan. 19, 1981, Crofut, a 38-year-old industrial radiographer with a record of at least 16 arrests on charges of drunkenness, other alcohol-related offenses and petty



Used fuel assemblies glow in a storage pool at General Electric Co.'s never-opened reprocessing plant in Morris, Ill.

every American. After all, there are many other hazardous substances both in storage and loose in the environment. Mercury, for example, is released by coal-burning utilities and smelting plants. Prolonged exposure to it will impair hearing and eyesight, affect the brain and central nervous system. It is so toxic that a single ounce could kill more than 1,400 people.

It is also simplistic to speak of radioactive waste as some kind of uniformly deadly substance. It is comprised of scores of different materials, each with its own peculiar characteristics. Some pose a hazard for hours. Some for days. Some for hundreds of years. Some are more dangerous if inhaled or swallowed.

The effects of two substances illustrate the variations. A person who happened to stand next to one ounce of cobalt 60 immediately after it was produced would receive a lethal dose of radiation in less than one minute. Ten years later, that same ounce of cobalt would deliver a fatal radiation dose in about three minutes.

A person who happened to stand next to one ounce of yttrium 91 immediately after it was produced would receive a lethal dose of radiation in less than one hour. But 10 years later, a person could carry around that same ounce of yttrium forever, and die of old age rather than from any radiation-induced disease.

All the variables notwithstanding, it is useful to think in terms of the overall level of radioactivity in the nuclear debris piling up across the nation. In that way one can gauge the seriousness of the waste problem now, its future dimensions and the care with which it must be handled.

The current concern over toxic waste dumps across the country will pale into insignificance if similar mistakes are made — and a few already have been — in the management of radioactive waste.

It should be remembered that 40 years ago this waste did not exist, 20 years ago it was present in comparatively tiny quantities, and what there is today is only a fraction of what there will be tomorrow.

Although most radioactive waste now is safely contained, it is stored temporarily in facilities designed to accommodate it for only a few years. In some cases a few decades. Because of the nation's failure to resolve the waste issue, these facilities have become by default what they never were intended — or designed — to be, permanent storage centers, thereby increasing the risk of accidental release.

It is for these and other reasons that today's political decisions and government policies will determine whether the country will be confronted with multiple radioactive Love Canals and Times Beaches in the years to come. For the most serious threat of nuclear waste is not that people will receive radiation doses from it directly, but that it will work its way into the food chain and water supplies and expose large segments of the population indirectly.

Nuclear Waste in America

clear waste. Little money was spent on research into the problems of managing it. There was virtually no public discussion of the technological, economic and social issues that would flow from its wholesale production.

The consequences of this neglect are everywhere.

Government agencies have failed to keep adequate records on where nuclear materials are handled and where the waste from them is put.

Administrative responsibility for regulating the nuclear-waste industry has been scattered among scores of federal and state agencies. Indifference to radioactive waste has become so deeply entrenched in government that the nature of this waste has never been explicitly defined, and no meaningful standards have been set for its management.

As the years have passed, government and private failures in waste management have been buried in official secrecy or obscured by a lack of public or political understanding of their implications.

Meanwhile, as nuclear knowledge has grown and as more information on waste management and radiation hazards has been accumulated, the scientific community has become deeply divided.

In fact, perhaps no other modern-day technological issue has split scientists so sharply — reassuring reports from the National Academy of Sciences notwithstanding — as what to do with radioactive waste and the potential health effects of radiation.

As the scientific debate has grown, radioactive-waste programs have been plagued by one failure after another — from the demise of reprocessing, long considered the linchpin of a nuclear society, to the breaching of low-level nuclear grounds, in theory the easiest of all nuclear waste to manage.

These failures, coupled with the conflicts in the scientific community, have led to confusion and uncertainty among government bureaucrats and lawmakers.

They have responded with a dizzying series of shifts in government waste-management programs. They have initiated projects and then scrapped them. They have charted courses and then abandoned them.

They have imposed double standards to protect the interests of the government but not the public. They have conceived plans in ignorance. And time and again, they have based their policies on faulty assumptions.

WASTE IN THE WATER. A National Academy of Sciences committee, in a report to the Atomic Energy Commission nearly three decades ago, warned that the practice of burying low-level waste above the water table posed "unacceptable long-term risks." The report cautioned:

"The committee thinks that the current practice of disposing of... solid wastes directly into the ground above or in fresh-water zones, although momentarily safe, will lead in the long run to a serious fouling of man's environment."

The government ignored the panel's advice and continued to bury waste above the water table. Since then, at three of six commercial dumps, radioactive materials have drained off into the food chain and water supplies and exposed large segments of the population indirectly.

Nonetheless, the Nuclear Regulatory Commission in 1982 formally approved the burial of radioactive waste above the water table. "A wide range of locations are potentially available for use as a near-surface disposal facility," the NRC said, "defining near-surface in its regulations as 'the uppermost 15 to 20 meters of the earth.'"

That means that in new nuclear cemeteries to be established across the country in the future, radioactive waste will be buried at depths ranging from 49 feet to 66 feet — generally above or near the water table.

level atomic garbage, exploded, showering the countryside with radioactive debris. A report on the incident, prepared by a Vanderbilt University professor for the Office of Nuclear Waste Isolation and released last March, offered another explanation: "At present, the best supposition is that there were many releases of wastes to the river system over time, plus an explosion in the fuel reprocessing plant...."

How we got here, A tale of ignorance, carelessness, confusion

How did the United States, the world's most advanced technological society, come to create an industry that produces mountains of deadly waste when there was — and is — no permanent way to deal with it?

Scientists, government administrators and politicians must share the blame.

In the early days of the atomic age, scientists joined with federal officials to promote the widespread use of nuclear materials despite vast gaps in their knowledge of the threat posed to society by radioactive waste.

Few controls were placed on nu-

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THE PROLIFERATING, NON-PROLIFERATING DUMPS. In March 1977, an NRC task force warned that "undisciplined proliferation of low-level sites must be avoided."

To prevent a rash of burial pits in individual states, the task force called for a much stronger federal role in developing and operating low-level dumps.

But in December 1980, Congress enacted the Low-Level Radioactive Waste Policy Act, which turned over responsibility for commercial burial sites to the 50 states.

If present plans are carried through, as many as two dozen low-level radioactive garbage dumps in as many states, some in geologically unsuitable regions, will be opened, resulting in the undisciplined proliferation that the NRC task force said should be avoided.

THE DOUBLE SAFETY STANDARD. In 1970, the U.S. government banned the land burial of plutonium and other long-lived radioactive materials, known as transuranic waste, on federal land.

The decision was prompted by mounting evidence that such waste, because of its long-lived radioactivity (plutonium loses only half its radioactive strength in 24,000 years), should be isolated from the environment deep underground.

But the federal government failed to impose a similar ban at privately run low-level waste burial grounds. Operators dumped plutonium in shallow graves at West Valley, N.Y.; Sheffield, Ill.; Maxey Flats, Ky.; Beatty, Nev.; and Richland, Wash.

Not until four years later did the government propose a similar prohibition at the commercial burial grounds.

Because of the increased quantities of such wastes expected to be generated, the long half-life of transuranics and their high radioactivity, the Nuclear Regulatory Commission said in 1974, "it was considered that such wastes in the future should be stored and disposed of at government-owned facilities."

The regulations were never implemented, and plutonium continued to be dumped at commercial sites.

From 1976 to 1978, government records show, 44 pounds of plutonium was placed in shallow graves at the Richland commercial dump. In

nation's low-level radioactive waste burial grounds, said that private companies would not receive licenses to bury waste at commercial sites until a difficult question had been answered.

Who would be responsible for the long-term care of the nuclear graveyards? Would it be the businesses and institutions that created the radioactive garbage, the companies that accepted it for a profit-making dumping enterprise, or the American taxpayers of the 20th and 21st centuries?

"Because of the type, level of activity and half-life of the radioactive wastes, it may be necessary to maintain land burial areas for an extended period of time, perhaps hundreds of years," an official of the Atomic Energy Commission told Congress.

"The feasibility of a commercially operated burial ground under AEC license, the official added, "is largely dependent upon resolution of this problem."

Before the agency could resolve the problem — which in fact remains unresolved — it bowed to pressure from private companies and began issuing licenses to operate low-level burial pits, each containing the inadequate provisions for long-term care that had been feared.

The cost of casual policy. Waste grows uncounted, unmapped, unmonitored.

The federal government's failure to come to grips with nuclear waste, to stem the chaos that runs through its waste-management policies, can be dated to the early years of commercial atomic power.

In the 1950s, everyone, it seemed, was captivated by the atom, a powerful new energy source expected to

credibly, nearly two-thirds of it came from the U.S. government or its contractors.

In other words, the same federal government that in 1970 outlawed the burial of plutonium at federal dump sites because of its potential health hazard continued to bury it at a commercial dump until 1979.

THE FAST-MOVING, SLOW-MOVING PLUTONIUM. Just before the commercial plutonium ban was proposed in 1974, the old Atomic Energy Commission reported that the land burial of plutonium at Maxey Flats, Ky., had worked quite nicely.

The plutonium had been dumped in trenches there with guarantees that it would move no more than a half-inch over the next 24,000 years.

Following a survey of the property, the commission said:

"Deep well water samples at the perimeter of existing licensed burial sites have not shown any detectable plutonium, indicating that plutonium already buried has remained immobile and therefore constitutes no potential hazard."

In truth, a study that same year by the Kentucky Department for Human Resources found that the plutonium — far from remaining "immobile" — already had seeped off the burial ground.

Forget the promise that the waste would move only a half-inch in 24,000 years; already it had moved hundreds of feet in less than 10 years, contaminating neighboring properties and stream beds. Later studies by the Environmental Protection Agency confirmed the state's findings.

No one could say for certain whether the plutonium had traveled deep underground along the earth's surface or both. No matter. It had moved — something the Atomic Energy Commission never noticed or failed to say if it did.

According to a report to the Kentucky legislature in 1977, an engineering firm calculated that airborne releases of plutonium were "over 10 times that presently allowed by NRC from nuclear power facilities."

THE UNRESOLVED RESOLVABLE PROBLEM. In 1959, the federal government, which then had sole responsibility for operating the

provide an endless supply of clean power and to revolutionize American lifestyles.

While politicians, business people and scientists marveled at their own predictions of what atomic power would accomplish — from generating electricity too cheap to talker of its byproduct: radioactive waste.

Still fewer thought the subject important enough to merit serious study. Looking back on those days, Carroll L. Wilson, the first general manager of the Atomic Energy Commission, once explained the lack of interest this way:

"It was not glamorous; there were no careers; it was messy; nobody got brownie points for caring about nuclear waste. The Atomic Energy Commission neglected the problem."

The neglect was so pervasive that the government never bothered to define radioactive waste. Instead, it created essentially two categories: "high-level" and "low-level."

It said that high-level waste was deadly and had to be handled with caution. That was true. The government implied that low-level waste was harmless. That was untrue. In fact, some low-level waste is just as lethal as some high-level waste.

The blurred distinction between the two led to cavalier treatment of low-level waste — so much so that federal agencies do not have the slightest idea how much is produced.

And because they don't know how much is produced, they don't know how much is piled up in temporary storage facilities across the United States, or dumped illegally.

This statistical failing will become more critical in the next several years as the three existing burial grounds gradually restrict the volume of waste they will accept from other states.

As this happens, incentives will grow to illegally dump or store the waste, or to establish additional "temporary" storage centers in warehouses or similar facilities where it may be kept for years.

Worse: The flawed statistics on the amount of waste are just part of a much larger problem — a disorganized and defective record-keeping system.

Quite often, the government has no records to show where radioactive waste has been stored temporarily, where it has been dumped permanently or where it has contaminated properties.

Private companies are permitted to bury radioactive waste on their own land. In many cases, the government does not know which companies are doing so, what kind of waste they have dumped, or where it is.

In still other cases, the government has lost or destroyed records identifying properties where radioactive waste was produced, and then has spent years trying to find them.

The faulty records are attributable, at least in part, to Congress' decision to divide responsibility for nuclear-waste management among the states and a variety of federal agencies.

In 26 states that have enacted laws to comply with federal standards, some nuclear waste is regulated by state agencies.

In the remaining 24 states, nuclear waste is regulated by the federal government.

Except that all 50 states regulate certain nuclear materials and enforce certain protective standards.

This jumble of regulatory and enforcement responsibilities means that there is no central record-keeping or accounting system, and that scores of federal and state agencies go their own ways in dealing with radioactive waste.

place in the treatment of certain diseases, and I prescribe it when I deem it necessary."

Skeptical citizens across the country wrote to the U.S. government for guidance. Many accepted the medical claims put forth for radium and only wanted to know whether the advertised products actually contained the wonder element.

In a letter to the U.S. Bureau of Standards in March 1926, a Dixon, Iowa, drug-store proprietor wrote:

"I wish to inquire as to whether your office certified all the radium used in Atrium as to its radioactivity..."

Replied the director of the Bureau of Standards:

"An alpha-ray test was made on a number of Atrium tablets submitted by the Associated Radium Chemists in September 1922. The material was found to be radioactive. We have had no further dealings with the company."

Some citizens, to be sure, were concerned about the safety of such products. In response to a Chicago man who wondered whether radioactive water "is injurious to the body years or any length of time after drinking it," the Bureau of Standards wrote in April 1926:

"This bureau has never heard of any cases of harmful effects due to drinking water which has been made radioactive."

The bureau never suggested that radioactive medicinal were beneficial. But when it found that a product advertised as radioactive in fact was not, the bureau referred the case to another federal agency for legal action.

Thus, in June 1926, when another Chicago resident asked whether therapeutic tubes marketed by a Dr. Abbott E. Kay contained the advertised radium, the Bureau of Standards replied:

"Some years ago this bureau received a number of preparations supposed to contain radium, and which were sold by a Dr. Abbott E. Kay of Chicago. Tests on these showed no signs of radioactivity, and the case was referred to the Federal Trade Commission for investigation."

Physicians who inquired about the radioactive content of the medicines and their beneficial effects received much the same response as the general public.

In October 1926, the bureau assured a doctor in St. Louis that Atrium tablets were indeed radioactive as promised, but cautioned:

"How beneficial such tablets are to the human system we do not know, as we are not concerned with the therapeutic value of such materials."

For more than a decade, the Bureau of Standards advised Americans that the pills, preparations and health waters they inquired about were indeed radioactive, and that it knew of no harmful effects.

Then, in the late 1920s, the bureau gradually began to change its position. When a Los Angeles resident asked about products for adding radioactivity to drinking water, the bureau responded in July 1928:

"We understand that radium in any form should be used only by specially trained physicians, and we would advise against the use of radioactive water produced by homemade methods."

While these private warnings continued, the federal government allowed sales of radioactive curies to go on, and they flourished until about 1932.

It had been just three years since Dr. Sabin A. von Sochocky had developed the formula for the radium paint that glowed in the dark.

Demand for luminous products boomed partly in response to the need for instrument dials during World War I and partly because the public had become enchanted by anything that glowed, from watch dials to house numbers.

In 1913, about 8,500 of the luminous dials were turned out. By 1919 — when Hazel Kuser was in her third year on the job — production had soared to 2.2 million dials.

For the dial painters, mostly young women like Mrs. Kuser, the job was relatively simple, ment and the medical and scientific communi-

ties was all the more remarkable considering what was happening at the same time in another industry.

Hazel Kuser was 16 years old in 1916, the year she went to work at the U.S. Radium Corp. in Orange, N.J., painting luminous faces on watches.

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the radium and mesothorium in the tonic — advertised as a cure for more than 100 ailments, including diabetes and senility — built up in Byers' bones and slowly ate away his body.

Because of Byers' business and social prominence, his death touched off wide-ranging federal investigations into the sale of radioactive curies.

The medical and scientific establishments, which with a few exceptions had maintained a discreet silence on the subject throughout the 1920s, immediately denounced the radium-based products.

No one will ever know how many people died from consuming radioactive nostrums during the years when authorities said they knew of no potentially harmful effects from the products — which by the late 20s included not only patent medicines but radium-filled chocolate candy.

The long delay in response from the government and the medical and scientific communi-

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An engineer checks for radioactivity in a waste burial trench at Barnwell, S.C.

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1982, he wrote: "It appears by clear and convincing evidence, much of it documented that representative government agents acting in the course of their employment were intentionally false or deceptive, that improper but successful attempts to pressure witnesses not to testify as to their real opinions, or to unduly discount their qualifications and opinions were applied... There was deliberate concealment of significant facts with reference to the possible effects of radiation upon the plaintiffs' sheep... A date for a new trial in the case has yet to be set.

Cancer rates at Hanford: How three studies led to a continuing dispute

On the surface, the deaths of the sheep exposed to the radioactive fallout in the 1950s — as were men, women and children in both Utah and Nevada who subsequently became ill with cancer or died — would seem to be little more than an interesting historical footnote. But it is much more.

In 1974, a Washington State epidemiologist discovered that workers at the Hanford Reservation, where the government produced plutonium for nuclear weapons, were dying of cancer at a higher rate than the general population — even though their exposure to radiation was well below permissible limits.

When the researcher submitted a draft report on his findings to the AEC, the commission reacted much as it had two decades earlier in the case of the Utah sheep. First, the AEC urged the researcher to keep his report confidential, saying that it was conducting its own study at Hanford and that the findings were expected shortly.

That was true, at least in part. Dr. Thomas F. Mancuso, a University of Pittsburgh epidemiologist, had been compiling health and radiation exposure data on Hanford workers since 1964 under a long-term contract with the AEC. Although Mancuso's work was not finished, the commission immediately asked him to issue a preliminary report stating that cancer deaths among Hanford workers were not above normal.

That, at any rate, was what the AEC expected him to conclude. Earlier, Mancuso's contract officer at the commission had written in an internal memorandum:

"Mancuso's project should permit a statement to the effect that a careful study of workers in the industry has disclosed no harmful effects of radiation, if the results are negative, as they are likely to be."

After Mancuso refused to rush out the requested report, his contract officer, who worked with the Energy Research and Development Administration (which had taken the place of the abolished AEC), informed him that his contract would be terminated in 1977. With time running out, Mancuso brought in two other researchers to assist him. One was Dr. Alice M. Stewart, an internationally recognized British epidemiologist. Back in the 1950s, Dr. Stewart had reported a link between X-rays of pregnant women and cancer in their children — a finding at first dismissed by the medical and scientific communities, and years later accepted as valid.

In 1977, Mancuso, Stewart and their colleagues released the results of their study: Hanford workers exposed to radiation doses within government safety standards were dying of a variety of radiation-induced cancers. True to their word, federal energy officials canceled Mancuso's contract and transferred responsibility for continuing the Hanford study to Battelle Memorial Institute's Pacific Northwest Laboratory — an organization that had never before conducted large-scale epidemiological research. The Battelle official placed in charge of the research was none other than Mancuso's former contract officer.

Since that time, Hanford researchers working under Battelle's direction have concluded that the Mancuso study was faulty. The Battelle researchers found no connection between radiation and the deaths of Hanford workers from lung cancer and myeloid leukemia, which have been associated with radiation exposure, or 11 other forms of the disease. The study did confirm the "correlation of radiation exposure with multiple myeloma and cancer of the pancreas," but added that the results were not conclusive.

These two stories — about the dead sheep in Utah and the dead workers at Hanford — have something in common. It is a name: Dr. Sidney Marks. Marks was one of the authors of the 1953 Hanford study cited by the AEC as evidence that the Utah sheep did not die from radiation exposure. He was the AEC contract officer who wrote the memorandum expressing confidence that Mancuso's research would show no connection between radiation exposure and cancer among Hanford workers. He was the ERDA official who informed Mancuso that his contract would be terminated.

It was the Battelle official placed in charge of continuing the study of Hanford workers, a study that found no connection between radiation exposure and most cancers. Today, Marks stands by his work. Similarly, Mancuso stands by his work. Marks declined to be interviewed about either the sheep research in the 1950s or the continuing cancer study at Hanford. After consulting with the public relations staff at Pacific Northwest Laboratory, Marks told an Inquirer reporter:

"I've been advised on the sheep situation that I'm a former GE employee. General Electric Co. managed Hanford at the time. GE is a defendant in a lawsuit that deals with the issue, and therefore it would be inappropriate for me to say anything about it."

As for the Hanford cancer study, he said that "I'm in an administrative capacity here mostly so that I don't stay close to it... Marks did acknowledge that there were significant differences between the Battelle and Mancuso findings, two studies based on the same records. Asked how the average person could decide what to think when one team of medical researchers says that low radiation doses cause certain cancers and another says they do not, Marks replied:

"I don't know how the layman can assess that. It's almost a hopeless thing. The tendency seems to be to accept the things that are of a more damaging nature. That's a trend, I think, everywhere. It seems to be furthered by the media, naturally."

This sharp division of opinion among researchers reflects a widening split within the American medical and scientific communities over exactly how much radiation may be absorbed without harmful effects. Although there are exceptions, the two sides break essentially along the following lines — and scores of studies have been published in support of both:

Scientists and researchers who worked for industry and some government agencies, either directly or under contract, and medical specialists such as radiologists, whose fields are based on radiation science, generally hold that existing standards not only are perfectly safe, but could be relaxed.

Scientists and researchers who work for private organizations or are engaged in the public health field, including many formerly employed by the federal government, believe that existing standards are leading to cancer, birth defects and other ills, and need to be tightened. Depending upon who is correct, one of these statements is true: • Thousands of people are dying needlessly as a result of excessive radiation exposure, and the long-range genetic consequences will not be recognized for decades. • Or government and industry are needlessly spending hundreds of millions of dollars to comply with standards that are too rigid and should be relaxed.

No one knows, or will know with any certainty for many years, who is correct. But if history is any guide, the odds are with those who argue that current standards are unsafe.

If so, tens of thousands of people will die of cancer and other illnesses before it is finally established that "permissible" radiation exposure was the cause of their deaths. But let history — as pieced together from more than a half-century's records of local, state and federal agencies, and from state and federal archives — speak for itself.

All the rage in the '20s: Radium cure-alls and dials with a deadly glow

Starting sometime around 1915 and continuing through the 1920s, ambitious salesmen hawked patent medicines and bottled water spiked with a new, marvelous medicinal element — radium.

These products, they boasted, would cure almost any ailment imaginable, including rheumatism, bowel trouble, indigestion, diabetes, piles, nervousness and lagging sexual powers.

Associated Radium Chemists Inc. of New York, a typical company, marketed a variety of tablets and ointments that contained "gen-uine radium certified by the United States government."

There was Arrium, a sort of all-purpose radium tablet; Dentarium, "radium for the teeth and gums"; Omatarium, "radium for skin eruptions"; Linarium, "radium for palms and soles"; and Kaparium, "radium for the hair and scalp." In an advertising circular, the company offered this explanation of radium's curative powers:

"Radium is the greatest example in the world of concentrated energy, and it must be remembered that this enormous energy is obtained from millions of tiny rays that are constantly being thrown out by radium. Traveling sometimes at the rate of 100,000 miles a second, and that even the amount of radium in each Arrium tablet will throw out millions of these rays of energy for thousands of years."

Even physicians touted the use of radium restoratives. A Pittsburgh doctor had this to say about bottled water laced with radium: "I believe that radium water has a definite

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ordered the utilities to begin removing the assemblies. The first shipment left West Valley last month.

Now for Nebraska. Back in 1967, the Nebraska Public Power District entered into a contract calling for General Electric Co. to supply nuclear fuel for its Cooper power plant and to assume responsibility for the used assemblies.

At the time, General Electric intended to reprocess the used fuel assemblies in a new plant it would build at Morris, Ill. But, although the Morris facility was constructed, the technology did not work and no reprocessing was carried out there.

The Nebraska Public Power District then sued General Electric to force the company to transfer the used fuel assemblies from the Cooper reactor, about 20 miles south of Nebraska City, to Morris.

Under an agreement reached in U.S. District Court in Lincoln in June 1981, General Electric must arrange for the transportation of the assemblies to its Morris plant. The first shipments are to be made before the year is out. Here, then, is nuclear-waste policy as laid down by the federal courts:

Under a New York Court order, used fuel assemblies will be removed from a closed reprocessing plant and trucked to electric utilities. Under a Nebraska court agreement, used fuel assemblies will be trucked from an electric utility to a closed reprocessing plant.

While the results of both court actions may be legally appropriate, good law does not necessarily make for good or consistent nuclear-waste policy.

Then again, neither does the shared regulatory authority mandated by Congress. Although scores of state and federal agencies are responsible for looking after nuclear waste, not one maintains a complete record of all the companies and institutions that produce it, or all the places they store or dump it.

The best possible estimate suggests that more than 10,000 businesses, institutions and government agencies handle radioactive materials. They include electric utilities, manufacturers of industrial, scientific and medical prod-

the states, the federal government, the nuclear industry and public-interest groups. But the subject is one that does not lend itself particularly well to judicial decision-making, for the courts have neither the expertise nor the resources to formulate the nation's nuclear policies.

They are doing so nonetheless, and as a result the legal system is imposing its own chaos over that spread by Congress and the states.

Nothing symbolizes the resulting anarchy better than a pair of unrelated cases decided in the last two years in federal courts in New York and Nebraska. First, New York:

A total of 750 used fuel assemblies from commercial nuclear reactors have been stored at the West Valley, N.Y., reprocessing plant since the facility closed in 1972. The assemblies had been shipped there by nuclear power stations in four states under contract with Nuclear Fuel Services, the plant operator.

The assemblies remained in the West Valley storage pool after Nuclear Fuel Services got out of the reprocessing business and turned the plant over to the New York State Energy Research and Development Authority.

The state agency, perhaps fearful that the presence of fuel rods at West Valley might lead to its selection for a national high-level radioactive-waste storage depot, sued the electric utilities to compel them to take back their assemblies.

The state argued that the utilities did not have a contract with New York and therefore the assemblies at West Valley represented "a continuing trespass."

For their part, the utilities maintained that it would be safer not to move the assemblies. Jersey Central Power & Light Co., for one, contended that "transportation of nuclear fuel, no matter how carefully done, inherently involves more risk than allowing it to remain at West Valley."

This was ironic because, in the past, when others have sued electric utilities to block similar fuel shipments, the utilities have insisted that hauling assemblies from one location to another was perfectly safe.

In any event, the U.S. District Court in Buffalo agreed with New York State. In June, it

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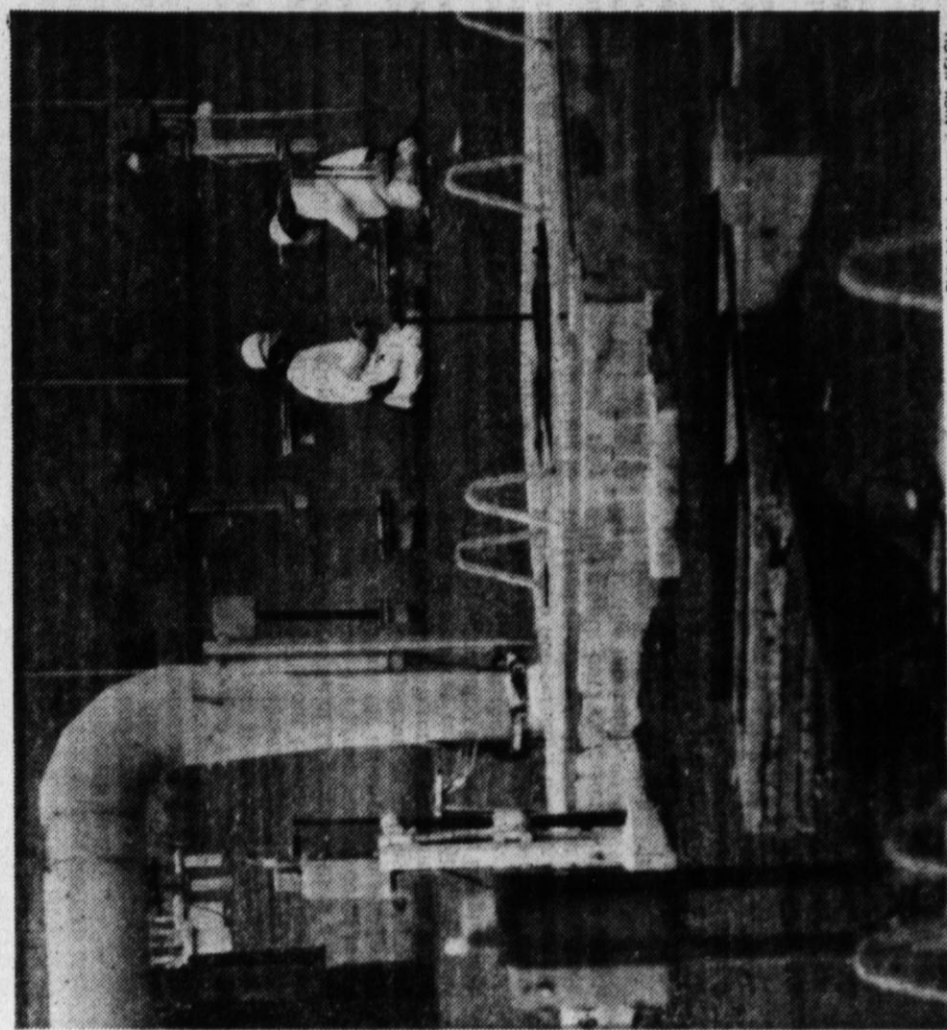
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AT HANFORD'S "TANK FARM," work goes on above stored radioactive liquids, the deadly residue from production of plutonium for nuclear weapons.

ucts; nuclear-waste brokers and haulers, and burial-ground operators. In all, these companies and institutions will bury a projected 45 million cubic feet of radioactive garbage during this decade — nearly double the volume buried throughout the 1960s and 1970s.

Yet few companies have been required to set aside funds for the future cleanup of their properties. It is true that several states, notably Illinois, Kentucky, New York and South Carolina, have established special funds to pay for the perpetual care of commercial nuclear-waste burial grounds.

But the revenue collected from the operators of the burial sites amounts to only a few million dollars, while the combined cleanup costs in those states eventually could run into billions of dollars.

The states without burial grounds are no better off. For, with few exceptions, neither they nor those with dump sites have set aside funds that may be necessary to clean up manufacturing facilities that handle radioactive materials.

They have not foreseen the need, even though the overwhelming majority of the companies in the nuclear industry, aside from electric utilities, are small businesses such as research laboratories and trash collectors.

Many rent or lease rather than own their equipment and the buildings from which they operate. Some are run out of family homes via a telephone answering service. Many operate from buildings no larger than a multicar garage. Almost without exception, they have limited financial resources.

Even the major corporations in the nuclear business, such as Exxon and Gulf Oil, have created nuclear subsidiaries with limited assets and for which the parent companies assume no financial responsibility.

Consider Nuclear Fuel Services Inc., a Getty Oil Co. subsidiary that managed both low-level and high-level radioactive wastes at the former reprocessing plant in West Valley, N.Y. During a hearing before a House Science and Technology subcommittee in June 1977, Rep. George E. Brown Jr. (D., Calif.) questioned Ralph W. Deuster, president of Nuclear Fuel Services, about the company's financial resources for cleaning up the West Valley plant.

Brown — What if you were stuck for a judgment for \$100 million? Could you satisfy it? Does the corporation have that kind of assets?

Deuster — No, it does not. Brown — It was set up just for the purpose of operating this particular facility, was it not?

Deuster — Yes, it was, basically. The Energy Department has since assumed responsibility for West Valley and has begun a 20-year project that could cost the taxpayer more than \$1 billion if the property is restored to its original state.

Nuclear Fuel Services, the subsidiary of Getty Oil Co., which has assets of \$9.9 billion and which had profits last year of \$69.6 million, will contribute about \$9.4 million toward cleaning up the radioactive debris at its one-plant, about 1 percent of the potential cost.

In failing to require private businesses to set aside funds to eliminate radioactive contamination from their properties, the state and federal governments have at least adhered to a consistent policy.

For the federal government also has failed to set aside funds to clean up its own properties. The Energy Department watches over about 400 buildings in which radioactive materials were once used. The structures have been sealed or fenced in and kept under surveillance to guard against intrusion and accidental radiation exposure.

In 1977, the Energy Research and Development Administration calculated that it could cost \$30 million a year for the next 100 years — or a total of \$3 billion — to clean up the facilities.

The General Accounting Office, the invest-

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gative arm of Congress, dismissed that figure as too low, saying, "We do not believe this is a credible estimate. The GAO proved correct. . . ."

Two years later, in June 1979, Worth Bateman, deputy undersecretary of the Energy Department, told a House Interior and Insular Affairs subcommittee that "the current estimate cost of solidifying the liquid waste at the government's Savannah River plant alone was about \$3 billion."

If the government proceeded to clean up all radioactive properties, including those where nuclear garbage has been piled up for years. . . . In all probability, some government land and buildings will never be free of radioactive contamination. Commenting on the future of the Hanford, Wash., facility, an Energy Department official told a House Science and Technology subcommittee:

"The Hanford site has an enormous amount of wastes on it. My guess on that particular site is that it is going to be a partially restricted use site for as long as man is around. . . . I think you will have those isotopes that can be cleaned up, but I suspect that there will be major federal facilities like the Nevada Test Site that are going to be dedicated as monuments to humanity and restricted for a long, long time."

The government's record Forty years of failure it has tried to hide

So it is that the 40-year history of America's handling of radioactive waste is one of unparalleled failures by the federal government during the infancy of nuclear-waste production — a record that says much about what may be expected in this decade and the decades to come, when the volume of such waste and the level of radioactivity in it will rise sharply.

But there is a darker side to the federal record — a story of deception, and of improper and hazardous practices.

It is a story of denial and concealment, of government actions based on scientific premises for which there was, and is, little or no hard supporting evidence — of government programs that have caused disease and death, yet remain in place.

It is a story begun in the secrecy surrounding the production of the first atomic bombs, and that is shrouded in secrecy today. . . . In the 1940s, for example, the government approved a plan that allowed a federal contractor to secretly dump 37 million gallons of radioactive liquid waste into shallow wells at Tonawanda, N.Y.

The waste was produced by Linde Air Products Co., which processed uranium ore at a federally owned plant for the Manhattan Engineering District, the government entity that was building the first atomic bombs. . . . Although Linde contended that the radioac-

These standards will take on growing importance in coming years as the radioactivity level in nuclear waste grows geometrically. For the way in which that waste will be handled, the extent to which it will be isolated from man and the environment, will be determined according to the radiation-protection rules.

And on the subject of permissible levels of radiation, the federal government's record is consistent. . . . It discredits and terminates research projects that suggest all is not as well as claimed. It conceals mistakes and issues misleading statements.

Dissent — any suggestion that disease and death may be attributable to radiation doses the government considers harmless — is not tolerated. . . . Sometimes the pressure is applied subtly, as Dr. Samuel Milham Jr. found out. A staff physician for the Washington State Department of Social and Health Services, Milham made a study of more than 300,000 males who died in that state from 1959 to 1971.

Milham concluded that workers at the Hanford nuclear plant were more likely to die of cancer than other Washington state males. Before he published his findings, Milham met with AEC officials at Hanford. As he later told a congressional committee:

"The impression I got at the meeting, with AEC was that release of my findings might cause concerns and problems in the industry. . . . I got to thinking [that] politically, and for a lot of reasons, it would probably be better in the long run not to publish it then."

Although Milham later published his study in an abbreviated form, others have not been so fortunate. Federal employees who questioned the safety of existing radiation-protection standards have been ostracized and pressured to quit.

Scientists who conducted research with federal grants lost those grants when they turned up evidence suggesting that people would develop cancer if exposed to radiation levels that the government and industry have maintained are safe.

In 1969, Dr. John W. Gofman, associate director of the government's Lawrence Livermore Laboratory in Livermore, Calif., and Arthur Tamplin, a physicist working at the laboratory, questioned federal radiation-protection standards at a scientific conference.

Although both had privately challenged the standards both had privately challenged the standards, the conference marked the first time the issue had been brought into the open. Tamplin described what happened next in testimony before a House Interstate and Foreign Commerce subcommittee in January 1978:

"All hell broke out. I had a group at that time at the laboratory of 13 people. Within a short period of time, the group was cut down to two people and then the other person was fired."

paper, why you shouldn't present that paper, why it is not appropriate or timely. So I am convinced that much more of this goes on. . . . Furthermore, there are not many people that wish to make an issue so they will lose their job and would no longer have support for their family and no chance of getting another job in their profession."

It should not be too surprising that a government that suppresses or discourages scientific challenges to established policies has, again and again, approved waste-management programs that turned out to be based on faulty scientific assumptions.

At West Valley, N.Y., for example, the scientific experts predicted that waste buried in trenches would be immobile, so firmly fixed that if it had been planted there 5,000 years ago, it would still be there today.

In a report to the Atomic Energy Commission in August 1964, Nuclear Fuel Services, which planned to operate the burial ground, assured the agency that radioactive waste could be safely contained at the West Valley site.

The silt condition of the soil, the company said, meant there was no chance that water would contact the radioactive garbage and then flow off the property, creating a hazard for area farms and communities.

Declared the company: "We have now had considerable experience in working with this material in various excavations in the course of constructing the plant and in the operation of a low-level waste burial operation. . . . The company said its calculations showed that "something over 5,000 years" would pass before any leached radioactive material even reached a ravine on the property.

As it turned out, the experts at Nuclear Fuel Services miscalculated by about 4,990 years. By the mid-1970s, less than a decade after the first nuclear waste was buried, radioactive runoff was a serious concern. New York state officials summed up the situation:

"By 1975, so much water had infiltrated the trenches that they began to overflow, resulting in the discharge of radioactively contaminated water into nearby streams which flow into Lake Erie, a source of drinking water for hundreds of thousands of people."

So it is that deceptive practices, false scientific assumptions, misguided policies and mistakes layered upon mistake have dominated the federal government's 40-year effort to manage radioactive waste.

It is possible that all this will change, that the government will alter its course, mount a concentrated campaign to develop a safe and permanent waste-management technology and then implement it.

billion curies. By the turn of the century, it will reach 42 billion curies, enough to kill everyone on earth. . . . Obviously, such a vast amount of radioactivity is not all in one place; it is scattered through thousands of tons of materials — some extremely hazardous, some not — stored in hundreds of places across the nation. But the total figure remains a useful yardstick for assessing the looming magnitude of the waste problem.

For as the volume of waste and the radioactivity in it continue to grow, the risk of exposure to the average American will grow right along with it. . . . And the government's record in managing nuclear waste is blackened by 40 years' worth of failed technology, faulty science and unkept promises. The government has never developed the kind of safe, permanent storage system it has promised since the birth of nuclear power.

What that means is this: In addition to the stated risk of "permissible" radiation doses, there is a second, unacknowledged risk that will apply increasingly to all Americans as the government goes about its efforts to manage radioactive waste. For example,

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The West Valley worker receives his air through a special breathing apparatus. Philadelphia Inquirer / Nick Kelsch

More than a quarter-century ago, the National Academy of Sciences put the answer this way: "Radiation in the general environment has not yet become a serious problem. In a few decades, however, radioactive waste products from atomic power plants will represent an enormous potential source of contamination. . . . How much of this radioactivity will actually reach the population depends on how successfully it can be kept out of the great network — ocean and air currents, food and water supplies — which connects man to his surroundings."

Even the AEC, which through most of its existence paid little attention to the subject, had a few words of caution about nuclear waste back in 1960. In its own carefully understated way, the commission warned that:

"Key factors in the hazards of atomic wastes are that radiation is not detectable by the unaided human senses, except at extremely high levels; that only time can destroy radioactivity; that toxic effects often are cumulative, and that injuries resulting from radiation may not become evident for some time."

• A series of low-level radioactive waste burial grounds are to be opened across the country in the next few years, including some in areas with heavy rainfall where similar dumps have leaked in the past. . . . An underground repository is supposed to be built for storage of used fuel rods from nuclear reactors — meaning that the nation's highways would be crisscrossed by trucks carrying lethal cargo from power plants.

• If such a repository opened, it would contain the largest volume of radioactive waste ever dumped at one site — and there is no way to be really sure whether that waste will stay put for 10,000 years or more, as the government claims, or leak out in less than 10 years, as has happened with low-level waste.

• If no repository is built — which is likely — then the used fuel rods, which will remain hazardous for centuries, will have to be kept at abandoned nuclear power plants in 100 or more communities. There they will have to be cooled continuously for many years by a water supply that must not fail.

When all of these proceedings are taken together, the risk of an accident seems not insignificant. But the major danger is not that large numbers of people will somehow be exposed to radioactivity directly. . . . Rather, it is the very real possibility that nuclear waste will slowly work its way into the environment — as some already has — and contaminate large land areas, getting into food and water supplies.

If that happens, the consequences may not be known for a very long time. Today's nuclear-waste producers and policymakers are showing the greatest risk — both for long-term destruction of the environment and genetic damage — onto future generations.

The National Academy of Sciences spelled out the latter concern more than three decades ago, but what it had to say then remains true today. . . . Genetic defects, as well as cancer, caused by radiation exposure are largely indistinguishable from genetic defects and cancer caused by other factors.

As a result, thousands of deformed and handicapped children "would be lost in the crowd," as the academy put it, because "no one could trace the direct connection between their special handicaps and the radiation dose."

With that in mind, one might expect the federal government to make serious efforts to gather all evidence about the effects of radioactivity, to set stringent exposure limits, and above all to protect the public from excessive radiation.

Has the government done so? The question is best answered by two stories. One involves dead sheep in Utah in the 1950s; the other involves an epidemiological study of workers at the Hanford Reservation, the sprawling government nuclear-weapons installation in Washington state.

It was against this background that the AEC rejected the Utah ranchers' claim that radioactive waste from nuclear-weapons tests had killed their sheep. So, in 1955, the ranchers sued the government in U.S. District Court at Salt Lake City.

Nuclear Waste in America

available, it is evident that radioactivity from atomic tests was not responsible for deaths and illness among sheep in areas adjacent to the Nevada Proving Grounds. . . . The U.S. Public Health Service agreed.

It is important to keep in mind the prevailing sentiment among government officials in the 1950s and 1960s on the subject of nuclear-weapons tests and the resulting radioactive fallout. . . . Willard F. Libby, a member of the AEC, best expressed that sentiment when he observed during an AEC meeting in February 1955:

"People have got to learn to live with the facts of life, and part of the facts of life are fallout. . . . Eight years later, in January 1963, the AEC argued against reducing the permissible radiation exposure for people in the neighborhood of atomic bomb tests. Said the agency, in a document that was classified at the time:

"We do not recommend any new radiation protection guides for nuclear weapons testing at this time. . . . To change the guides would raise questions in the public mind as to the validity of past guides. . . . What the AEC was saying, roughly translated, was that the dosage limit should not be lowered because then people would think the old limit had not been safe — which it was not.

Looking back on those years, F. Peter Libassi, general counsel for the former U.S. Department of Health, Education and Welfare (HEW), told a joint congressional subcommittee in April 1979:

"The American people were not informed of the evidence that was gathering during the 1950s and 1960s of the uncertainty as to the health effects of radiation from these atmospheric nuclear tests. . . . I would say there was a general atmosphere and attitude that the American people could not be trusted to deal with the uncertainties, and therefore the information was withheld from them."

"I think there was concern that the American people, given the facts, would not make the right risk-benefit judgment."

It was against this background that the AEC rejected the Utah ranchers' claim that radioactive waste from nuclear-weapons tests had killed their sheep. So, in 1955, the ranchers sued the government in U.S. District Court at Salt Lake City.

The judge, A. Sherman Christensen, later recalled how a parade of government experts came before him to express "convincing judgment that radiation damage could not possibly have been a cause" of the sheep deaths. . . . Three of the government's witnesses, who were veterinarians, originally had suggested that radiation was a factor in the deaths; later, three claimed to be especially qualified in the field.

In addition, government witnesses testified that scientific experiments on the effects of fallout on sheep had been carried out at the federal Hanford Reservation in Washington state. These experiments, the witnesses said, showed that the Utah sheep had not died of radiation.

At one point during the trial, the ranchers' attorney, Dan S. Bushnell, suggested that the government had covered up information and that the experts "got their conclusions and proceeded to substantiate it." Judge Christensen then asked:

"Now, Mr. Bushnell, if the government witnesses . . . either knew or suspected the possibility of that extent of fallout and those consequences to animals . . . and realizing also that not only the welfare of the people in that area but the welfare of future generations . . . would be jeopardized by a false appraisal of the situation, in that respect, do you want me to believe

How the sheep died. A nuclear 'fraud' 30 years old

In 1953, Utah ranchers charged that fallout from atomic bomb tests in Nevada had killed more than 4,000 of their sheep. The sheep had been grazing 40 to 160 miles from the above-ground explosions.

The Atomic Energy Commission, which oversaw the tests and was charged with ensuring public safety, denied any responsibility. After investigating the allegations, the commission reported:

"On the basis of information now

FOREVERMORE.



A cleanup worker at the defunct West Valley, N.Y., reprocessing plant suits up before entering a room contaminated with radioactive dust.

An industry born amid the dreads of a fearful time

In the late 1950s, the federal government began to test a nuclear rocket engine — intended to carry man first to the moon and later to Mars — on a desolate stretch of the Nevada desert called Jackass Flats.

The government's atomic-energy enthusiasts harbored no doubts of the project's wisdom. Space, said one, "will be conquered only by manned nuclear-powered vehicles. Planning anything else is... flirting with obsolescence."

American astronauts eventually went to the moon six times; unmanned spacecrafts landed on Mars twice. Each of the craft, like all others launched into space, was powered by conventional fuels — not the atom.

The atomic spacechip was a dismal failure. One test nuclear engine actually shook itself to pieces. There was always the nagging fear that such a vehicle's exhaust system would spew out radioactive waste as it circled the earth.

For years, about all that remained from the failed experiment was radioactive garbage scattered across Jackass Flats, including, according to an Energy Department official, "little pieces of the fuel element [that] blew out the end of the rocket."

Indeed, it was not until earlier this year that federal cleanup crews got around to picking up all the radioactive trash from the desert floor.

Although the atomic rocket to nowhere is only a distant memory, the highly charged atmosphere that surrounded its development goes a long way toward explaining the nation's nuclear-waste dilemma.

Throughout the 1950s and 1960s — the glory days of the atom, when reason and logic were suspended — experts in government, business and science believed that nuclear power offered the solution to all of mankind's ills.

More important, they believed that the kind of step-by-step testing that had preceded the introduction of new technologies in the past could be disregarded, that the United States could simply leap into the atomic future.

They acted accordingly, launching a commercial nuclear industry before the technology was perfected, before answers had been found to the many questions that needed to be answered, not the least of which was what to do with the large volume of radioactive waste that the industry one day would produce.

To understand, then, why radioactive waste is piling up in the 1980s, it is helpful to recall the Cold War psychology that gripped America's leaders when they made the critical nuclear decisions of the 1950s.

At the time, some believed that the United States was locked in a life-and-death struggle with atheistic communism and could not afford to allow the Soviets to win the race for nuclear power.

Others believed that the nation had a moral obligation to devise peaceful applications of the atom to atone for the nuclear bombing of Japan.

And still others were captivated by the atom's miraculous promise; they believed that atomic energy could be harnessed for almost any commercial use imaginable, that it would become the ultimate energy source overnight.

While the motivations were mixed, all these groups — and there were influential politicians and scientists in each — were united in their desire to propel America into the atomic age.

Then Undersecretary of State Walter Bedell Smith mirrored the sentiment of those who feared the communists when he told Congress' Joint Committee on Atomic Energy in June 1953:

"It would be very damaging to the position of the United States if another country were to be first in this field of endeavor, and it would be especially damaging if the Soviet Union were to precede us in the development of atomic power."

Nuclear Waste in America



Atomic Energy Commission

SPACE ENTHUSIASTS ONCE SAW nuclear energy as the ultimate fuel for interplanetary travel. But like many other predictions, the atomic spacechip they depicted never became reality.

"If this were to happen," Smith warned, "the Soviet Union would cite their achievement as proof of their propaganda line that the United States is interested in atomic energy only for destructive purposes while the Soviet Union is interested in developing it for peaceful purposes."

During those same hearings, U.S. Sen. George W. Malone (R., Nev.) spoke for those who believed in the atom's marvelous capabilities when he said that its commercial use could change the course of history more than "the invention of the wheel."

Members of Congress, federal officials and scientists conjured up a fantasy world of commercial shipping fleets and locomotives powered by the atom and automobiles run on electricity generated by atomic power plants, all before the year 2000.

They envisioned a dramatic increase in farm production, putting an end to world hunger for all time, thanks to the atom.

And they foresaw atomic excavation, in which nuclear power would level mountains, hollow out harbors, alter the flow of rivers and, as it was put at the time, perform other "feats of rearranging the contours of the earth."

Since much of the technical information dealing with atomic energy was still classified because of military demands, there was nothing to dampen overheated imaginations.

But even those with access to the secrets engaged in wild predictions of how the atom would alter American lifestyles in the near future.

No less an authority than the Atomic Energy Commission insisted that atomic energy would heat large office buildings, hotels and apartment complexes, and that neighborhood nuclear reactors would heat individual homes.

"The nuclear lifestyle would be encouraged, it was said, by a community with new atomic heat."

Newspapers, magazines, radio and television all got caught up in the atom hysteria. "Our atomic program is expanding rapidly; plan for atomic airplane is only one of numerous signs of progress," declared a typical headline in the Sept. 9, 1951, New York Times.

The Atomic Energy Commission was especially enamored of atomic-powered airplanes, notwithstanding the probability that passengers would have to be exposed to some "acceptable" level of radiation.

Pointing to a number of advantages — "range unlimited by fuel tanks; [and] freedom from a system of overseas refueling airfields" — the commission reported in September 1955: "The desirability of applying nuclear power to aircraft propulsion has long been a matter of common knowledge, and extensive development toward that end is in progress."

Special-interest groups, from farmers to equipment manufacturers to electric utilities, were swept up in the atom frenzy, along with other business groups and labor and religious organizations.

Each group lobbied Congress and federal agencies, demanding that the atom be developed specifically to satisfy its needs.

There were, to be sure, some pessimists. But their ranks were thin, their words of restraint routinely dismissed. Politicians who were reluctant to join the headlong rush to a commercial nuclear economy were viewed as backward, if not unpatriotic.

Business people who urged caution were warned that if they did not build nuclear power plants immediately, the government would build its own and compete with them. Scientists who suggested that still more work was needed in the laboratory, that many technical riddles remained to be unraveled, were scorned.

It was not that the dissenters failed to air their views in public. It was just that no one wanted to hear them, especially on the subject of some distant problem of radioactive waste. Everyone listened when a nuclear-waste specialist for the Dow Chemical Co. told the Joint Committee on Atomic Energy in February 1957:

"We feel it is important for all to know that this [waste] disposal problem has been taken care of by new technology recently demonstrated."

No one listened when the nuclear-waste specialist for the Atomic Energy Commission told the Wall Street Journal that same month:

"We're merely sweeping the real problem under the rug."

ber... to... died... her... was... in a... bath... like... son... my's... work... sso... tip... the... all... ser... -on... red... for... trat... ing... a be... ctal... ctile... oac... ate... ned... test... by a... ey... ber... lobs... late... ob... ion

PART TWO

America's supersalesman of low-level nuclear waste

He showed up on the streets of tiny Sheffield, Ill., on a summer day in 1966.

He was a salesman bent on selling an idea. To the townspeople, he proposed a plan to convert an abandoned farm into a burial ground for low-level radioactive waste.

Although there were skeptics, he soon wore them down. He organized publicity campaigns. He mobilized local business people on his behalf. The project, he said, would create jobs in a county that was one of the most depressed in the state.

Perhaps most important, he allayed the fears of residents concerned about how radioactive waste would be and what harm it would cause if anything went wrong. "The radioactivity in a lot of cases is no more than the radium dial of your watch," he told interested citizens who turned out for a Bureau County zoning board hearing.

As a further measure of his sincerity, he assured the local folks that he would be at the burial ground daily and would personally receive the largest dose of radiation that could be emitted.

"In a year's time," he said, "I will absorb about the amount of two chest X-rays, and I will be there every day."

Having won over the town, he secured a permit to develop the site, and within a year trucks from around the country were running over the back roads of Illinois to deposit thousands of cubic feet of radioactive waste in freshly dug trenches three miles southwest of Sheffield.

Over the next 10 years, thousands of 55-gallon drums packed with radioactive waste were dumped into trenches 12 to 26 feet deep and covered over with dirt.

Just as the salesman had said, some of the drums contained no more radiation than the dial of a luminous watch.

But other drums were loaded with lethal materials — such as plutonium in quantities sufficient to build atomic bombs of the size dropped on Nagasaki — as well as other, less deadly but still potentially harmful radioactive waste.

Today, the atomic garbage dump is closed. At least one radioactive substance, tritium, is seeping off the property — something the salesman had said could never happen — and is contaminating adjoining lands.

PHOTOGRAPH BY MICHAEL O'NEILL



A headstone marks the end of a trench filled with nuclear debris at the Sheffield, Ill., burial ground

Soon after the first waste-disposal trucks rolled into Sheffield, he sold out and moved on, to ply his trade in similar pastures, near similar small towns.

The story of Beierle, a 52-year-old father of six, the supersalesman of the low-level nuclear waste business, is very much a part of the story of how radioactive waste has been managed in the United States for the last 20 years.

For, contrary to the repeated claims of government and industry, radioactive-waste management is not a carefully controlled, tightly structured business run on proven scientific principles and held in check by responsible political decision-making and thoughtfully conceived regulations. Far from it.

Rather, it is a world in which scientific assumptions turn out to be wrong time after time, a world in which politics are so divisive that unsound and temporary waste-management programs are implemented, a world in which no one really knows how much nuclear trash is produced.

It is a world in which regulatory authorities are fractured, a world in which technologies fail more often than they work.

It is in this world that atomic garbage dumps are established by a spellbinding salesman who for 20 years has traveled from town to town across rural America, peddling the wonders of nuclear America.

Fredrick Beierle set up two of the three commercial nuclear-waste burial grounds operating today in the United States — in Richland, Wash., and Barnwell, S.C. (The remaining site, at Beatty, Nev., was established by a company once headed by a business associate of Beierle.)

Taken together, Richland and Barnwell account for 98 percent of the nuclear waste buried annually at commercial dumps.

Clearly, Beierle's activities have made him a pivotal figure in the management of low-level nuclear waste. But he has received little national publicity. He does not testify at congressional hearings delving into the problems of radioactive waste or the lessons that might be learned from the past.

Repeated efforts by inquirer reporters to interview him in person or by telephone over the past year have been unsuccessful.

On one occasion, when a reporter telephoned his Prosser, Wash., office, a woman answered who identified herself as Mrs. Beierle and said her husband would not answer any questions.

"We do not find that publicity with low-level radioactive waste ever comes out the way it is meant to, the way we talk to people, so our policy is no interviews," she said.

"I am Mr. Beierle's wife. I have gone through all of these things personally. Newspapers per se have such a poor reputation with us that, you know, it is very difficult for me to even be nice to you on the telephone."

"You people twist the words, you leave out things, just so it comes out the way you want it to come out, not the way the people you are interviewing project it."

Indeed, it is likely that from Beierle's point of view he has been doing this nation a major favor. The kind of low-level nuclear trash he deals with is piling up at an ever-increasing rate all over the country, and it has to be put somewhere. If Beierle and other entrepreneurs don't find the sites, they might ask, who will?

Not the federal government, that's for sure. It abandoned that responsibility years ago.

A man of many interests: Creationism, dinosaurs, a truck that runs on hay

Operating out of Prosser, a small town in the agriculturally rich Yakima Valley, he has made a career out of showing up in other small towns across the country, quoting from the Scriptures in the same breath with pronouncements on the wonders of nuclear energy, in an effort to persuade locals to let him bury nuclear waste.

To those who have witnessed Fred Beierle over the years, the effect has been nothing less than mesmerizing.

Says a businessman in a small Texas town where Beierle once tried to establish a nuclear-waste dump:

"If he just walked in this door, and I knew nothing at all about him, I would think he was

radiation. Since 1956, the government has insisted that the permissible level need not be reduced further — a position matching that of the nuclear industry, which would be hard-pressed financially to meet stricter standards.

How safe — or reliable — are the government standards? Back in 1953, the Atomic Energy Commission (AEC) observed that "the body may safely receive a small dose of radiation because the effects are repaired virtually as rapidly as they are produced."

Over a period of many years, a human being may safely receive a total amount of radiation which would cause a fatal illness if administered to his whole body within a period of few minutes.

Commenting on what was then the permissible dosage, the AEC declared:

"Through long study of the effects of such exposures, it has been determined that a dose of 0.3 roentgen per week (15 rems a year) may be delivered to the whole body for an indefinite period without hazard."

The maximum permissible weekly rate of exposure is designed to assure safety for persons regularly exposed to penetrating radiation over periods of many years.

Although the dosage limit was established for nuclear-industry workers, the government sought to imply that, in fact, anybody could receive 15 rems a year without harmful effects.

In truth, if America's 230 million citizens

each received 15 rems next year, nearly 700,000 men, women and children would die of cancer as a result.

That figure is a middle-of-the-road estimate, based on one medical-risk assessment. Some physicians and scientists, applying different formulas, would put the figure lower. Some would put it higher.

In any event, the 700,000 represents only fatal cases of cancer. It does not include occurrences of those that like thyroid cancer, are considered curable. Nor does it take into account the genetic mutations that would be passed along to future generations.

The 15-rem limit, of course, was set back in the 1950s. Knowledge of radiation's effects has increased greatly since then.

That's why the government insists that the current limit — 5 rems per year — is perfectly adequate.

But then again, that's what the government said in the 1950s when it insisted that 50 rems a year was safe.

The truth is, officials, physicians and scientists were only guessing in the 1950s.

And they are still guessing today. There is no hard, irrefutable evidence on the subject. There are only epidemiological studies — evaluations of the patterns of disease across large groups of people — and these can be used to support a variety of positions.

That is why some authorities can maintain the 5-rem restriction is quite adequate, while others can maintain that even lower amounts of radiation are killing people today.

Nobody denies, though, that 5 rems is a calculated risk. If every American alive today received that much radiation next year, about 230,000 would die of resulting diseases — by the same middle-of-the-road estimate.

And, of course, an untold number would suffer from nonfatal diseases and birth defects.

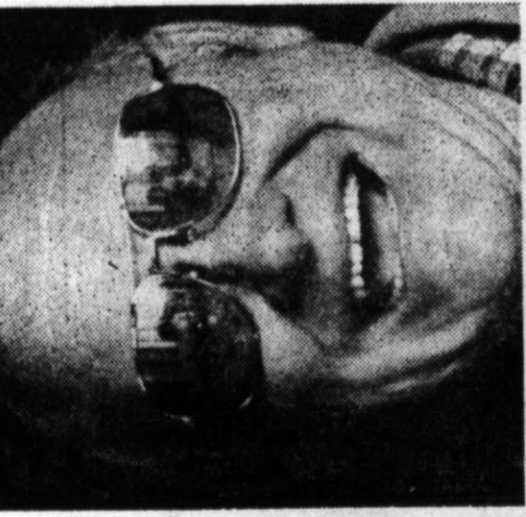
In the past, the dispute over permissible radiation doses mainly affected workers in the nuclear industry — people who had consciously decided that employment was worth the potential risk, much as coal miners accept the possibility of developing black lung disease.

Now it is taking on significance for the entire population, for Americans will be increasingly exposed to radiation in future years — without any benefit to themselves, and, in many cases, without even knowing it. What's more, they will have no say in whether or not they wish to take the risk.

The increased radiation will come from the growing volume of nuclear waste. And the dispute over standards is significant because the government sets radiation limits for the public based on what it deems acceptable for workers in the nuclear industry.

This is no easy task since there is a wide division of opinion both between and within government agencies. Generally speaking, those who support a more relaxed attitude toward radiation exposure have prevailed. Just how important is the radiation protection standard for nuclear waste?

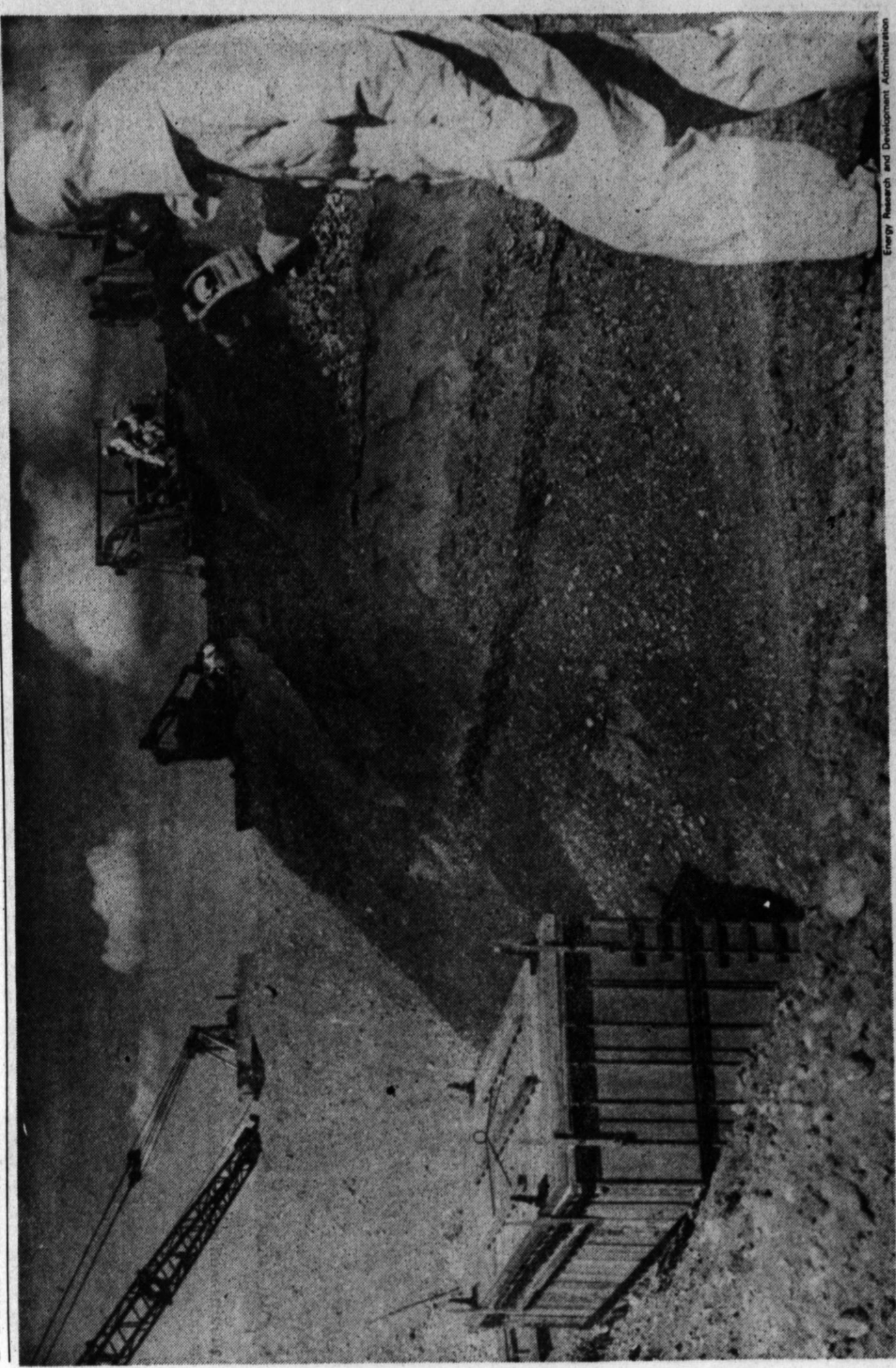
FOREVERMORE.



Fredrick P. Beierle

Energy Research and Development Administration

A worker at the Hanford Reservation monitors radiation in a trench where a crate of worn-out and contaminated equipment is being buried



Nuclear Waste in America

PART EIGHT

The game of cancer roulette

Unwittingly, Americans gamble on radiation exposure

This is a story about a game devised by the federal government called cancer roulette.

If the government's betting line is correct, it will save hundreds of millions of dollars in the coming years. The nuclear industry will save much more.

If the government's betting line is wrong, tens of thousands of Americans — many of whom don't know they are playing the game — will develop cancer, other diseases or birth defects, and die.

The game rests on a simple assumption:

That the government, and the scientists and physicians who support its position, are right when they say they know exactly how much radiation the public may receive without ill effects.

The government has been playing the game for many years and says it has seldom lost.

Others disagree. They say that the government — or, more to the point, the unsuspecting players — have lost many times.

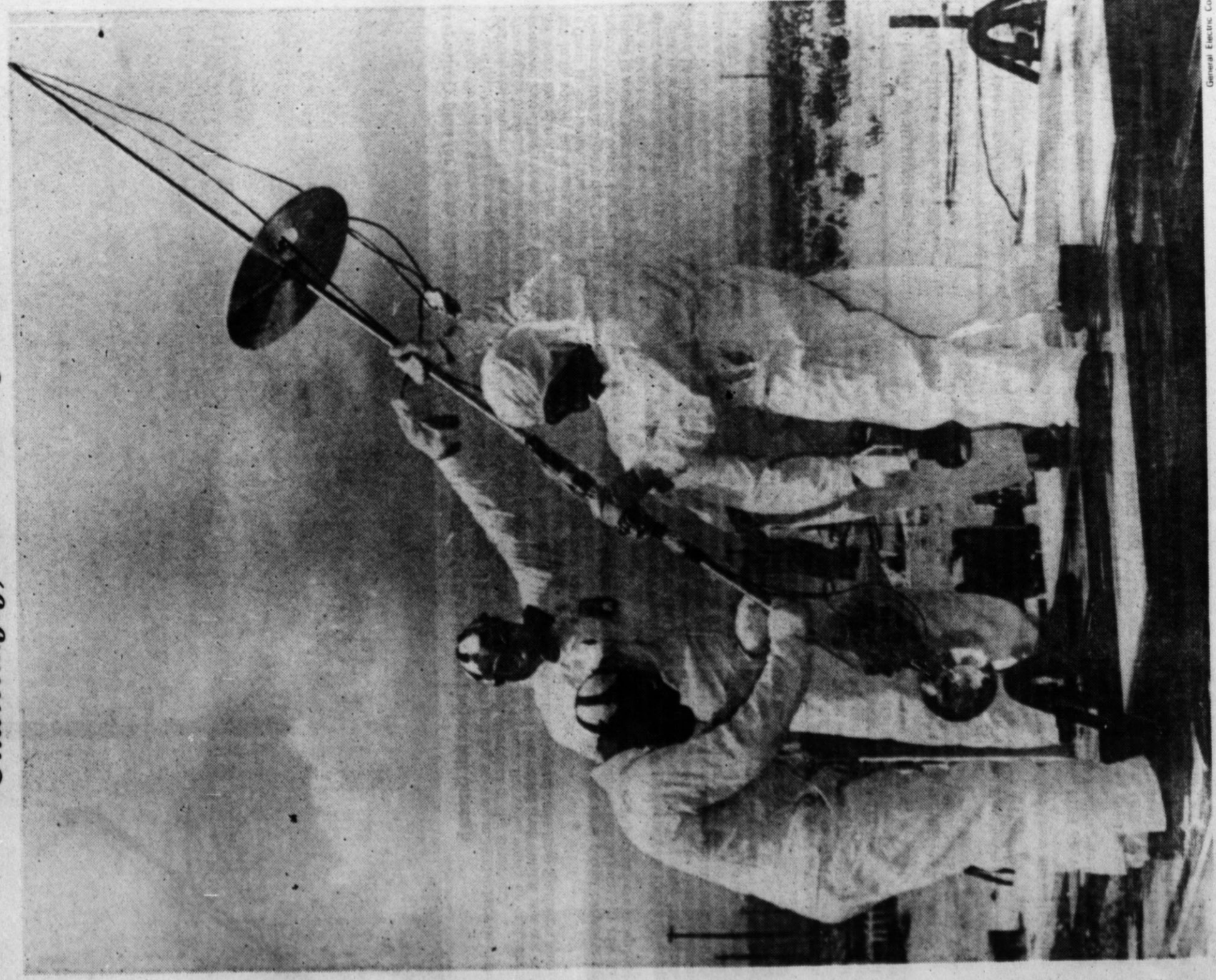
Whenever research has turned up evidence that these critics are correct — that, in fact, legally permitted levels of radiation are causing cancer — the government has immediately commissioned new studies to disprove the findings.

Who is right? No one can say, yet, but there is plenty of evidence that the gamble is a risky one. That evidence lies in a trail of corpses — from dead workers at the Hanford nuclear reservation in Washington state to dead sheep in Utah, from dead Marshall Islanders to dead residents of Nevada.

In some of those deaths, evidence points overwhelmingly to erroneous government assumptions about the effects of radiation as the cause. In others, the verdict is still out.

The government would like to keep the verdict out forever.

The Inquirer's investigation of the government's handling of nuclear waste, including the processes by which federal officials create radiation-safety standards to pro-



WEARING PROTECTIVE SUITS, workers at the federal Hanford Reservation in Washington state lower a camera into a storage tank for radioactive waste in this 1957 photograph. There have been many studies of Hanford employees; some researchers contend that radiation exposure has led to a higher rate of cancer among Hanford workers than in the state population as a whole, but other scientists argue that this conclusion is unfounded.

The travels of Fredrick P. Beierle

1 1965: Sets up radioactive dump at Richland, Wash.

2 1966: Moves to Sheffield, Ill., to set up another dump for radioactive waste.

3 1969: Goes to Burnwell, S.C., to start another radioactive dump site.

4 1975: Incorporates a company in Prosser, Wash., that fabricates potato-processing equipment. It also repackages radioactive waste.

5 1975: Travels to DeWitt County, Tenn., and attempts to start another radioactive dump.

6 1976: Opens The Book and Bible Store in Commerce, Texas.

7 1976: Leads archaeological expedition for dinosaur and human tracks.

8 1977: Sets up a waste dump for toxic chemicals near Baton Rouge, La.

9 1978: Forms company in Prosser, Wash., to promote a gasifier that burns cherry pits, rubber tires, paper sacks and chicken manure to produce synthetic gas to generate electricity.

10 PENDING: Application to set up another radioactive waste dump in an abandoned salt mine near Lyons, Kan.

a preacher. When you talked to him for long, you were just made to feel he was a man of God, that he was standing there right at the foot of the cross.

Says a state regulatory-agency official who has known Beierle for years:

"Fred really fools people. He's funny-looking, with freckles all over his face. He doesn't seem at first very impressive. But then he starts talking and you listen. Very few people can talk as well as Fred Beierle."

Says a Kansas man who has seen Beierle in action:

"One part of you says you ought to know better about some of the things he tries to tell you. But he's so convincing you find yourself believing him when you know you shouldn't."

Although Beierle approaches nuclear waste with an evangelical fervor, he is a man of many interests.

He is a creationist, a person who eschews Darwin's theory of evolution, believing instead that the earth and all its life forms were created in much the way the Bible says. Creationists believe that the earth came into existence not millions of years ago as evolutionary theory holds, but only about 10,000 years ago at the most.

In between efforts to set up nuclear-waste dumps, he has led archaeological expeditions to debunk evolutionary theory and to prove creationist views. On one such outing, Beierle unearthed fossilized tracks that he later wrote as proof to the nation that "man, giant man and dinosaur" all lived at the same time.

When not trying to establish radioactive-saur tracks, Beierle experiments with exotic energy sources.

He has promoted a gasifier that, according to published accounts, runs on a secret material that converts cherry pits, cornstalks, wood chips, rubber tires, paper sacks and chicken manure into synthetic gas.

Beierle eagerly shows off the gasifier to interested parties, saying that it powers a generator that gives him excess electricity to sell back to the local power company.

The utility district said that it did purchase

power from Beierle's generator, but only rarely. A spokesman for the district said that the generator usually operated only when Beierle was showing it to a visitor. The reason, he said, is that it costs Beierle more to generate a kilowatt-hour of electricity than the utility pays him.

Another project is a pickup truck he has adapted to run on hay, wood, weeds and other waste products. To dramatize the truck's potential, Beierle and his brother once drove it from Los Angeles to New York.

The family business in rural Washington state, though, may be the best example of Beierle's knack for juggling interests. In two small metal buildings on the outskirts of Prosser, Wash. (pop. 2,000), B & B Equipment has managed to serve two unrelated industries: It has fabricated food-processing equipment, and it has repackaged liquid radioactive waste from power plants.

That Fred Beierle would become the nation's foremost salesman for nuclear-waste cementerics is perhaps understandable given his background.

Beierle started his career at the sprawling Hanford works operated by the Atomic Energy Commission (AEC) in southeastern Washington state.

Covering an area equal to half Rhode Island, Hanford dates from World War II, when it manufactured the plutonium for the atomic bomb dropped on Nagasaki.

Situated in a desolate, thinly populated area, more than 100 miles from the nearest city of consequence (Spokane, pop. 175,000), Hanford is a world unto itself, fiercely proud of its role in atomic development and disparaging of critics of nuclear energy.

The region makes no secret of its partisan-ship. Atomic Foods, The sports store at neighboring Richland High School are called the Bombers. The school's symbol is a mushroom cloud.

It was in this decidedly pro-nuclear milieu that Fred Beierle (pronounced "bay-er-lee")

from remote Deer Lodge, Mont., broke into the business in 1954. He took a job as an assembly-line worker fabricating metal parts for the fuel elements of Hanford's nine nuclear reactors.

Beierle quickly used the experience as a stepping stone, and within six months had been promoted to reactor operator, a job that taught him how to start up, shut down and refuel nuclear reactors. Most importantly for his future, it also taught him about handling the waste that they churned out.

At that time, most low-level liquid radioactive waste was discharged directly into the ground on the theory that "natural environmental conditions, as the Atomic Energy Commission's 1964 annual report put it, would diffuse the radioactivity to 'safe levels.'"

It eventually was determined that this practice — like so many others in the nuclear-waste business — was a bad idea, and it was discontinued.

Beierle parlayed his experience at Hanford into a succession of jobs in the nuclear industry, according to records of state regulatory agencies. In a four-year period, he worked at six plants in three states, "starting up," as he once described it, nuclear reactors. Then, in 1962, a federal decision set the stage for him to go into business for himself.

Until then, the federal government had maintained responsibility for low-level nuclear waste. Radioactive debris was dumped in the oceans off California or New Jersey, or else it was buried in trenches at AEC installations in Tennessee and Idaho.

But in 1962 the AEC decided to close off the two federal burial grounds on land and to encourage private operators to develop burial sites. Thus, the task of deciding where to inter nuclear waste and how to manage it, once a federal responsibility, was given over to private developers. The decision, which was to have far-reaching consequences, went virtually unnoticed.

Unnoticed, that is, except by those who saw a way to get started in what was bound to grow one day into a booming business. Before the year was out, licenses to bury radioactive waste had been granted to one company, Nu-

clear Engineering Co. for properties in Beatty, Nev., and Maxey Flats, Ky., and plans for a similar operation were in motion for a site in western New York state.

To Beierle, who was then a shift supervisor at the AEC's EIR River test reactor near Minneapolis, the decision was an invitation to go into the nuclear-waste business.

Along with two other men, one a professor of nuclear engineering at Purdue University and the other a health physicist from California, Beierle founded California Nuclear Inc. in April 1963.

The company was incorporated in one state (California), but had offices in another (Indiana) then proceeded to establish its first burial ground in yet another state (Washington). Although California Nuclear proposed that it would provide a variety of services to the nuclear industry, a primary goal, as spelled out in papers on file with the State of California, was to "own or lease, develop and operate" burial grounds for radioactive wastes.

Of all the locations for which Beierle would summon up his superior powers of salesmanship, the place where he established his first nuclear-waste dump offered the least challenge.

The property adjoined the Hanford works, the AEC reservation where Beierle had gotten started almost 10 years earlier. Already committed to atomic development, people around Hanford had few anxieties about nuclear energy or its waste byproducts.

The selling job there was not on the public, but rather on state and federal officials whose help Beierle needed, for the tract to be developed was on federal land.

After months of negotiations, California Nuclear worked out a deal in which the federal government leased the parcel to Washington state, which in turn subleased 100 acres to California Nuclear.

Thus, at little cost to his company, Beierle had managed to get control of land that would prove of inestimable value in years ahead when the volume of nuclear waste soared in the United States.

To help the company get started, the Small

FOREVERMORE

Business Administration provided a \$147,000 loan, according to California Nuclear's records. And so, with a powerful assist from the federal government, which provided the policy, then the land and finally the working capital, Fred Beierle was on his way.

Sheffield's new neighbors The Fred Beierle family and a nuclear-waste dump

THE one he settled on was in rolling farmland three miles southwest of Sheffield, Ill., a town of 1,000 about 125 miles west of Chicago.

Sheffield was ideal for Beierle's purposes. It was strategically located in north central Illinois, only a few miles from Commonwealth Edison Co.'s Dresden nuclear power station, the nation's first full-scale commercial nuclear plant, and within close range of six other projected nuclear plants that soon would make Illinois the foremost state in generating electricity by atomic power.

The property was in an isolated, sparsely populated region where Beierle was not likely to encounter much opposition. He planned to purchase the land, then deed the burial ground to the state. While federal policy encouraged the private development of waste dumps, it required that the land be owned by either the federal or state governments.

To win over the local folks, Beierle moved his wife, Vesta, and the children to the town. He opened an office on Main Street. He joined civic clubs. His wife played bridge with other housewives. He mingled with village leaders and preached the economic benefits of radioactive-waste burial grounds.

The radioactive particles, he assured residents, would remain in the burial ground where "the soil in fact acts as a water softener, so this radioactive material can die away and present no hazard because it is contained with-

in that soil. When one resident asked whether cattle could graze on the nuclear waste-burial ground after it was filled with nuclear trash, Beierle replied: "It is possible."

Noting that radioactivity levels in the waste to be buried would be quite low, Beierle declared: "The material we are handling is sweeping compound, glassware, rags, clothing contaminated with even chairs. In some cases the rubbish material we put in the drums and bury is less than the radium of an alarm clock."

Years later, after learning that 34 pounds of plutonium and 70 pounds of enriched uranium were buried at Sheffield, residents bitterly recalled Beierle's assurances. Both materials are lethal; neither could be buried under regulated low-level waste sites such as Sheffield. Ironically, Sheffield also turned out to be the burial plot for a nuclear reactor that Beierle himself helped start up before he entered the radioactive-waste business. About 47,000 cubic feet of debris from the AEC's Elk River test reactor in Minnesota, where Beierle worked in 1962, was dumped into Sheffield's trenches in the early 1970s.

The only opposition at the 1966 rezoning hearing came from a United Mine Workers representative who arrived from Washington, D.C. The union man opposed the project because the nuclear industry threatened to take jobs away from mine workers by reducing the demand for coal. With no local opposition, the zoning board unanimously approved Beierle's rezoning request.

Three weeks later, California Nuclear applied to the AEC for permission to bury waste

at Sheffield. The company submitted voluminous documents to support its case that it possessed the expertise to handle the job. Beierle, whom it described as a man of long experience in the field, would be the company's resident manager, Mr. Beierle, the application stated, "is now living at Sheffield. All burial operations will be under the direct personal observation of Mr. Fredrick Beierle."

The company also contended that the proper site was ideal for the burial of nuclear waste. A geological report submitted by the company's private consultant said that Sheffield was "adequate on nearly all counts."

California Nuclear assured the AEC that "no increase in the natural radioactivity will be due to the burial of radioactive wastes. Although the Sheffield site was in an area that received substantial rainfall, a factor that led to major fluctuations in the water table, no government agency seriously questioned California Nuclear's optimistic assessment of the geology."

The Illinois State Geological Survey said that the Sheffield location was "far superior" to others in the state and possessed the "appropriate geological and hydrological factors."

The U.S. Geological Survey said that company data indicated that conditions "appear to be suitable for burial of low-level solid radioactive wastes."

The AEC expressed concern about the "inadequacy" of some data, but after California Nuclear drilled a few more test wells the federal agency was satisfied. On July 13, 1967, it gave the company permission to begin burying waste.

Within a year, California Nuclear and Fred Beierle, the man who told Sheffielders that he

would be at the burial ground "every day," were gone.

The business was sold to Nuclear Engineering Co., which then operated nuclear burial grounds in Beatty, Nev., and Maxey Flats, Ky. California Nuclear's licenses to bury waste at Sheffield and Richland were transferred to the new owner.

But that was not the end of the Sheffield story. In 1976, Illinois health inspectors discovered that water was seeping into closed trenches and carrying off radioactive tritium.

The Illinois Department of Public Health was disturbed. Up to them, Sheffield's trenches had been considered "impermeable" because the waste was buried in clay. "If tritium could migrate," a state legislative report warned, "so could other contaminants."

Even so, the health department did not acknowledge to the public that the burial ground might be geologically unsuitable. In a letter to a Sheffield resident in 1977, Dr. Allen N. Koplun, the department's acting director, said: "The soils at the site are highly impervious to water ... the time required for the waste to migrate from the point where it is buried to the site boundary will be long enough for the radioactivity to decay away."

That assessment proved far too optimistic. By the end of 1978, tritium leakage was even more pronounced. A Bureau County judge determined in March 1979 that "radioactive contamination has reached, or is about to reach one site boundary."

Then, early in 1982, tritium showed up for the first time in monitoring wells off the nuclear graveyard. This prompted renewed court action against Nuclear Engineering Co., which by then had changed its name to US Ecology, and led to the drilling of yet more test wells.

Recent tests have turned up more evidence that radioactivity is continuing to leak out of the burial plot.

According to court papers filed by the Illinois attorney general, the tests show that tritium has "migrated at least 700 feet away from the site boundary through at least one relative-ly narrow geologic pathway consisting of coarse, sandy soil extending away from the site in a northeasterly direction toward a strip in mine pond."

The leaks go on even though the Sheffield facility was shut down in 1978, when the existing 20-acre burial ground was filled to capacity.

Just what, if anything, can be done is the subject of considerable debate. A Nuclear Regulatory Commission study ordered in 1980 offered a variety of bizarre methods for halting the off-site seepage of radioactivity.

The recommendations ranged from dropping 40-ton weights on defective trenches to blowing up portions of the burial ground with dynamite.

The Illinois attorney general's office, for its part, has come up with another set of possible solutions, including:

- Constructing a barrier wall to prevent further leakage.
 - Shorting up the trenches and pumping out those that contain water.
 - Constructing a facility to capture and treat all escaping radioactive material.
 - Digging through defective trenches to remove contaminated material.
- If none of these suggestions is approved, the attorney general's office has a fallback position. It will seek a court order to force US Ecology to purchase more land to the north and east as a buffer to absorb the steadily moving tritium.
- In other words, Illinois would create a second nuclear-waste site to trap the radioactive runoff from the first one, from which nuclear waste was never to seep out.
- Thus, the nuclear burial ground Beierle established at Sheffield is likely to be the subject of legal wrangling among Illinois, private landowners and US Ecology for years.
- Fred Beierle will not be involved in those court cases, though. When the trouble began at Sheffield, he was long gone.

can undergo spontaneous combustion and no amount of engineering will make them acceptable.

"Biological wastes, scintillation vials, and other non-solidified wastes ... can give off toxic or hazardous fumes. Strict measures for ventilation, filtration, and personnel control must be added if these wastes are not to be excluded."

On the basis of the application submitted, the NRC concluded, "it appears that many major waste types may be unsuitable for storage or disposal."

While his application hung fire, Beierle went about business as usual.

His activities fed suspicions in Kansas that he already had an understanding or agreement with some government agency for long-term use of the mine as a storage site.

In November 1980, Rickano bought the Carey mine for \$350,000. Then in February 1981, Beierle announced in the local press that Rickano would spend up to \$1 million to repair the mine's main shaft, which was blocked at the 700-foot level.

A month later, workmen showed up in Lyons from a company identified as the American Mining & Drilling Co. of Tucson, Ariz. According to published reports, the company described itself as the U.S. subsidiary of a Scottish concern that repaired mine shafts around the globe. Crews spent several months working on the shaft.

If Beierle's proposal is approved, the old Carey salt mine will become the first low-level radioactive waste dump to be established in the nation since 1971, when the Barnwell, S.C., burial ground — also a Beierle venture — opened.

But as matters now stand, it is not clear which states might have access to the Lyons facility. This is because of the confusion now prevailing among the states about how to comply with the Low-Level Radioactive Waste Policy Act of 1980.

Passed by Congress in the waning days of that year, the law made states responsible for the low-level waste they generate and urged them to set up regional burial grounds for it. Kansas and eight other states in the central part of the nation are eligible to join the Central Interstate Low-Level Radioactive Waste Compact.

The federal government's repository plan for Lyons called for waste to be shipped to the mine; in the end, the project fell through

To date, Arkansas, Kansas, Louisiana, Nebraska and Oklahoma have enacted legislation approving the compact. Iowa and Minnesota are also eligible but have voted to join the Midwest Compact. Two other states, North Dakota and Missouri, are also eligible for both compacts but have not yet taken any action on either.

Once in operation, the Central Interstate Compact could designate the Carey mine as the region's low-level burial site and, if it chose, refuse to accept waste from any state that was not a member of the compact. The 1980 law gives compacts that authority.

But it is questionable whether the mine would be economically viable as a waste site under those conditions. That is because the mine states generate a small volume of waste. In 1981, for example, they produced 170,000 cubic feet — just 6 percent of the national total.

This problem might be solved if the Central Interstate Compact agreed to receive waste from another region — such as the proposed Midwest Compact, which may include Illinois, a state that by itself generates 9 percent of the nation's low-level waste.

Rickano is optimistic: There have got to be more disposal sites

I n the meantime, Beierle's application is on hold. State officials said no action will be taken until the Central Interstate compact commission is in operation.

Beierle has transferred ownership of his Lyons house to Rickano and returned to his home base in Prosser, Wash. A son, William Beierle, moved to Lyons and worked briefly for Rickano before his death in April 1981.

(Lyons police say that young Beierle, 20, bled to death from a cut received when he broke into a

house after a day-long binge on alcohol and drugs, including LSD and methamphetamine.)

Efforts by inquirer reporters to interview Fred Beierle over the last year have been unsuccessful. In one telephone call to his Prosser office, a woman who identified herself as Mrs. Beierle said that her husband would not be interviewed.

"He will not speak with you," she said. "Newspaper people per se, as well as TV people, they always like to edit something so that it's very negative. We're not negative about the nuclear business. We think it is a good business and our children are working in it. If we have our children working in it, would we?"

Beierle's associate in Rickano, James L. Harvey, did agree to speak to a reporter: Harvey said that Rickano was waiting for more states to ratify the Central Interstate Compact before doing any more repair work at the mine.

"Sometimes it comes back to haunt me, but I want to be completely candid with you," Harvey said in a telephone interview in 1982. "This was an election year, so we didn't do too much at the mine because the first thing you know is that some politician who is running behind would grab that and make an issue out of it. So this year we have been very quiet. And besides, we don't have much money right now."

Asked if he was optimistic that Rickano's application to store low-level waste in the mine would be approved, Harvey answered: "I am optimistic or we would not have spent the money or the time. There have got to be more disposal sites."

He estimated that, after a permit was granted, Rickano could begin storing waste in six months to a year.

"There is 50 million cubic feet of storage space in the mine," Harvey said. "There are actual rooms down there. You could store it by customer or by type of material or any way you wanted to. It would just be a beautiful operation."

"If a customer wanted to come back in 10 years and play with his waste, we could tell him exactly where it was and let him have at it."

He said he and Beierle were also considering more sites in other states. "We have a couple of plans," Harvey said, "we're all in this together."

"nothing we want to divulge because of the competitiveness of the situation."

To finance the mine work, he said, about \$400,000 was raised from outside sources, and additional capital came from Southwest Nuclear.

According to the most recent corporate report on file with the Kansas secretary of state, shareholders equity in Rickano is now up to \$1 million.

But the documents indicate little change in the stockholders' list. The same individuals who were named as Rickano shareholders in the beginning — Beierle, Harvey and Beierle's female relatives — are still so named today.

However, Mrs. Farrens, Beierle's mother-in-law, who is listed as the owner of 89,000 shares, told an inquirer reporter in the summer of 1982 that she no longer owned stock in Rickano.

Interviewed on the doorstep of her home in Richland, Wash., Mrs. Farrens said: "I cut loose of that a long time ago. We got very interested in it because of our son-in-law. He is on it at the time. Then we saw it was going to be tied up in politics, so we cut loose. We're poor people."

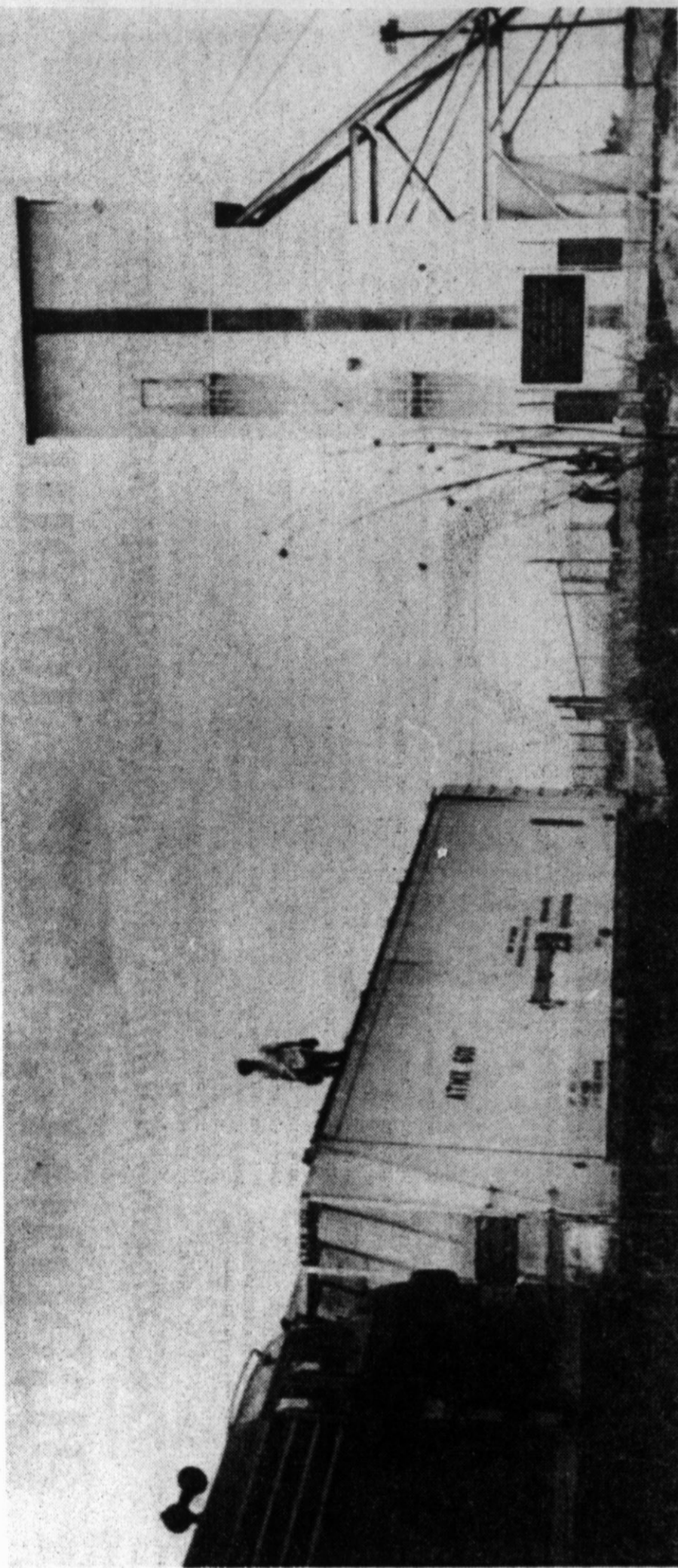
"You invested at the time?" a reporter asked. Mrs. Farrens — Yes, we had a little money at the time. It looked like the thing to do. But then we got out.

Reporter — Did Fred buy back the stock? Mrs. Farrens — I guess so. I don't really remember.

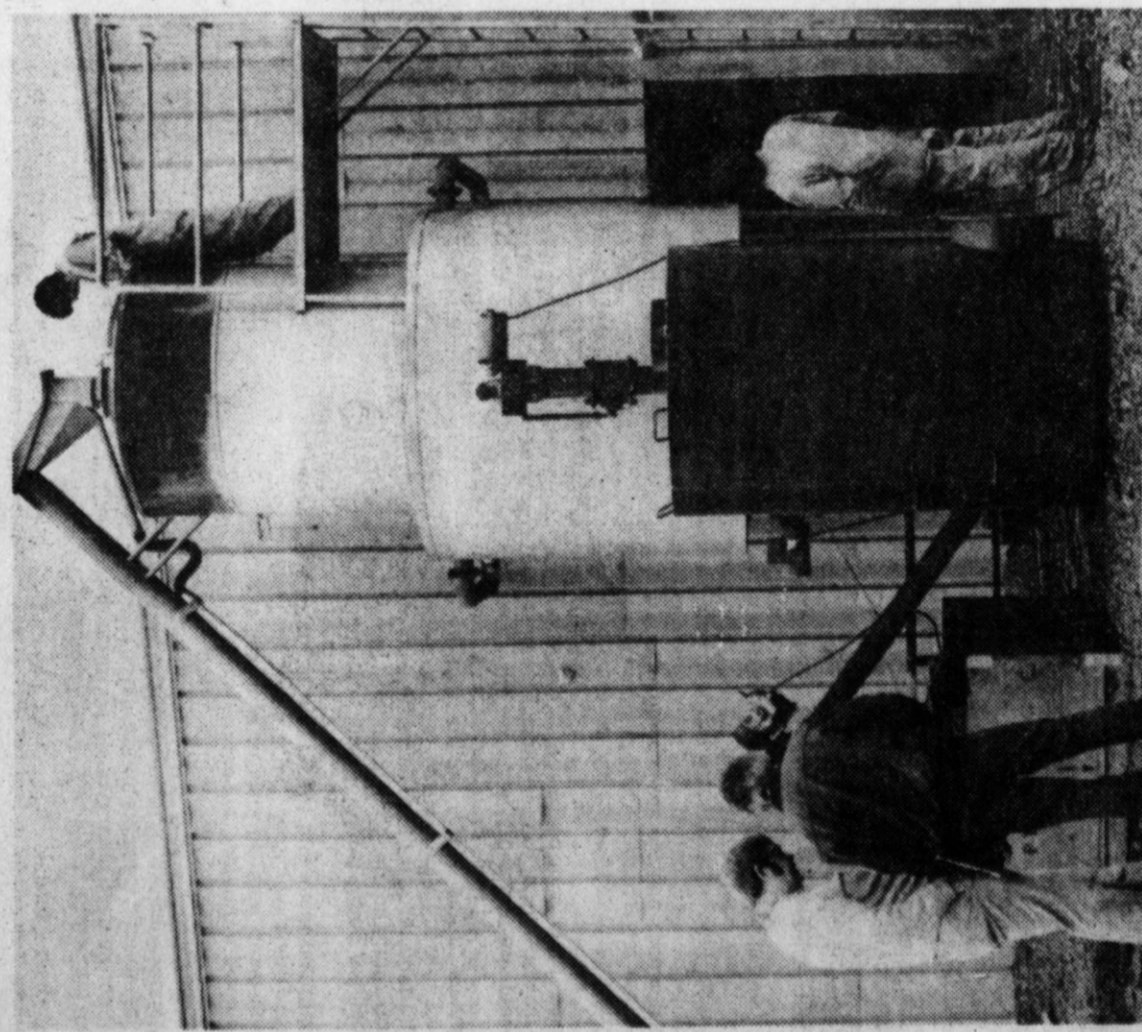
Reporter — Do you know any of the other investors? Mrs. Farrens — No, I don't know a thing about it. I have something on the stove. I am going to have to go.

Another Rickano shareholder, Beierle's 27-year-old daughter, Janice Ratray, told a reporter that the Lyons mine project had taken "a lot longer than we thought it would." But she added, "Things are starting to look up now. I think Reagan sees the need."

As for Rickano, the only company in the 50 states with an application pending to bury low-level nuclear waste, Mrs. Ratray said: "I guess you could call it a family business. We all believe in nuclear and we believe in Dad and what he's doing. I guess that's why we're all in this together."



Atomic Energy Commission



THIS MACHINE is a gasifier that Beierle says runs on a secret material that converts cherry pits, cornstalks, wood chips, rubber tires, paper sacks and chicken manure into synthetic gas. The gasifier powers a generator producing electricity that he sells to a local utility.

The-City (Wash.) Herald / SUE TAYLOR

Nuclear Waste in America

Nuclear Waste in America

center primarily around the receipt and above-ground storage of materials from chemical plants.

The new venture, Beierle continued, was to "make available to the chemical industry in this region the safe techniques and procedures for pollution control that have been applied so successfully for a number of years in the nuclear field."

Beierle heaped praise on state officers and legislators for their help. "I know of no state where it is such a pleasure to do business," he said.

For a time, Beierle's new company did indeed engage in the chemical business. Then, on April 13, 1971, South Carolina granted Chem-Nuclear permission to bury nuclear waste on the property.

By then, Beierle had moved on.

As soon as the property was selected and the regulatory process under way, he and his partners sold their interest in Chem-Nuclear Services to a company called the Great Columbia Nuclear Systems Inc. For several years afterward, Beierle was a director of that publicly held corporation, which emerged as one of the largest handlers of nuclear waste and has operated the Barnwell burial ground ever since.

site was mentioned, the company said it intended to work with the state officials to locate one.

Beierle was identified as general manager. The directors included Dr. Robert E. Bergstrom and Dr. Walton A. Rodger.

Bergstrom was head of the ground-water section of the Illinois State Geological Survey. Rodger, the application stated, had been general manager for the "construction, start-up, licensing and operation of the world's first privately owned nuclear fuel reprocessing plant" at West Valley, N.Y.

That plant proved to be a disastrous failure which the federal government now is cleaning up at a cost that could exceed \$1 billion.

Other directors were from Beierle's home state of Washington. They included the owner of a drive-in restaurant in Longview, a wheat rancher in Lind and an apple orchardist in Moses Lake. The company's assets totaled a modest \$150,138.

Working closely with state officials, Beierle soon settled on a 200-acre tract near the Savannah River Plant, outside the small town of Barnwell, S.C.

In June 1969, he announced his plans for the property — but Barnwell residents were given little indication that it was destined to become the burial ground for much of the East Coast's low-level radioactive waste.

In between attempts at setting up nuclear burial grounds in various states, Beierle returned to Washington.

Nestled at the foot of the picturesque Horse Heaven Hills, Prosser — "A Pleasant Place with Pleasant People," as a road sign on the edge of town puts it — is home ground for an extensive clan of Beierle's relatives: brothers, cousins, nieces, nephews, daughters and grandchildren.

It is also the home of the family business, B & B Equipment. The company's officers in-

cluded Beierle; his wife, Vesta; his brother, Leonard; and Leonard's wife, Pat, according to state corporation records, and has provided employment for other family members over the years. Beierle's father, for example, was the company's night watchman, living in a trailer adjoining the property until his death in 1981.

B & B consists of two modest, garage-like metal buildings just west of Prosser. Papers on file with the state describe the company's business as the "fabrication of potato processing equipment." And that is the type of work with which most local business people associate the company.

"B & B manufactures agricultural equipment," said Richard Gay, publisher of the Prosser Record Bulletin. "Farmers need all kinds of specialized equipment."

But that is not all B & B has done in Prosser. It also has repackaged radioactive waste — on the same property where it has manufactured food-processing equipment.

The waste repackaging has been done for electric utilities that operate nuclear generating plants. The work consists of solidifying liquid low-level nuclear waste so that it can be buried at one of the nation's three commercial sites. Regulations prohibit the burial of nuclear waste in liquid form.

To do this work, B & B was issued a radioactive-materials license by Washington state. Most recently work at the site was performed under a similar license held by SouthWest Nuclear Co. of Pleasanton, Calif., headed by a business partner of Beierle's, James L. Harvey.

Beierle once was president of SouthWest. On an inspection trip to B & B in September 1979, when one of the waste-solidification jobs was in progress, an inspector for the state Department of Social and Health Services observed violations of regulations for radiation protection.

How little Barnwell, S.C., became a major center for nuclear garbage

When the Sheffield and Richland operations were sold to Nuclear Engineering in 1968, Beierle joined the new owner as manager of sales and promotion, but the association lasted less than six months. By the end of 1968, Beierle was on the road again, in search of yet another potential burial ground.

His attention soon focused on South Carolina, which, like Washington state, looked favorably on atomic development. South Carolina was the home of the Savannah River Plant, the huge AEC installation that manufactured plutonium for nuclear bombs.

Beierle's new company was called at first Intercontinental Nuclear Inc.; a few months later the name was changed to Chem-Nuclear Services Inc. It had offices in Richland, Wash., and Rockville, Md.

On Nov. 4, 1968, Intercontinental filed a proposal with South Carolina to build and operate a radioactive-waste burial ground. Though no

"agreement state" — the term for the 26 states that have volunteered to take on some regulatory functions in the low-level waste field, including the licensing of burial and storage facilities. In "non-agreement states," the federal government does the regulating.

This division in responsibility grew out of a 1959 amendment to the Atomic Energy Act that was sought by a handful of states, notably New York, and was aimed at giving them a foothold in what was then expected to be a burgeoning new atomic industry.

Even though Kansas, as an agreement state, is responsible for ruling on Beierle's application, it did not have the staff to evaluate the proposal (there are only four full-time professional workers in the state's radiation-control division), and so it asked the NRC for help.

NRC staff members have since traveled to Kansas to inspect the site and to interview Beierle and his associates.

But — as is typical of the entangled regulatory structure that governs every phase of nuclear-waste management — the NRC's questions about the suitability of the site and the company's qualifications have been directed to the State of Kansas, rather than to Beierle or Rickano.

That's because regulatory protocol makes the state the lead party in ruling on the application, even though the NRC did most of the initial work. Kansas had the option of following up on questions raised by the NRC or ignoring them.

The double layer of regulatory review has complicated the process of assessing the application, which has been pending for five years.

Analysis of NRC documents on the Rickano proposal shows that the confusion generated by Beierle's latest venture was not confined to the Lyons public. Federal officials were equally puzzled about some aspects of his proposal.

Among the first questions the commission could not answer was why Rickano would even consider the mine for storing only hospital and institutional wastes — a plan that the company now says has changed.

"...the waste that Rickano has asked permission to store represents a very small percentage of low level waste generated in the U.S. (our estimate is about 3 percent of total) and contains mostly short-lived isotopes," wrote R. Dale Smith, chief of the commission's low-level licensing branch.

"If there is a mismatch, it is because the isolation characteristics of the site are much more than are needed for the type of waste." Beierle's startup costs, the NRC said, would be "significantly higher" than those for a shallow land burial operation. The old mine shaft would have to be refurbished, a new shaft would have to be drilled and ventilation equipment would have to be installed in the mine.

"If the volume is small, and the expense of rehabilitating the mine is high, why is Rickano interested in developing the facility?" Smith asked.

After a preliminary review of the application, the NRC informed Kansas authorities on July 10, 1979.

"We believe the concept of a mined cavity waste facility has merit. However, the applicant has made only superficial efforts to describe the planned design and operation of the facility."

Of concern to the NRC was Rickano's failure to take note of the special procedures and facilities that are necessary when waste is stored in a mine, instead of in surface trenches.

"Flammable materials may well have to be excluded due to the warehouse-like operation of the mine," an NRC official wrote. "Flammable materials and containers may have to be incinerated on the surface or excluded from the mine if adequate fire protection is not designed into the facility. Some of these wastes

merely a foot in the door for the federal government.

Most suspicious of all is Max McDowell, a former press secretary to Kansas Gov. Robert Docking, who was in office when the Carey mine was first proposed for high-level storage.

McDowell lives in the town of Elmdale, about 80 miles east of Lyons. Shortly after Beierle proposed Lyons for low-level radioactive waste retrievable storage, McDowell began to delve into the history of the Lyons mine.

McDowell believes that, in reality, the federal government never gave up on the Carey mine as the site for a high-level repository, and that Beierle is merely a vehicle to allow federal scientists and contractors to get at the mine once again.

"The federal government needs access to the Carey mine to validate their computer models on a salt repository," McDowell says. "This is the only place in the world they have implanted spent fuel in salt. They have 20 years of

research based on that mine and they don't have time to start over somewhere else."

Beierle declined to be interviewed about his plan for the Carey mine, or any of his other business operations. But he has denied in public meetings at Lyons that he would put high-level waste in the mine.

As the fact sheet he distributed at a 1979 meeting explained:

"Absolutely no nuclear fuel will be received at this facility. High-level nuclear waste is, strictly, a federal government responsibility. No licensing procedure exists that allows a firm such as ours to store high-level waste."

The application wallows in a slough of tangled regulations, murky law

Even if Beierle's proposal is for exactly what he said — a site for the storage of low-level radioactive waste — it remains a textbook case of the convoluted regulatory environment that governs the licensing of such facilities.

To secure a permit to put nuclear waste in the mine, Beierle applied to the Kansas Department of Health and Environment.

The application was made to the state rather than to the federal Nuclear Regulatory Commission (NRC) because Kansas is an

buried outside their town would, in a lot of cases, amount to "no more than the radium dial of your watch."

As it turned out, after the Sheffield burial ground was licensed, Beierle's company sold its interest in the dump, and he left town. Subsequent operators buried plutonium and enriched uranium — two of the most hazardous substances of the atomic era — in Sheffield's nuclear graves.

The confusion over the type of radioactive wastes that would go into the Carey mine has engendered yet another anxiety in central Kansas.

Some residents fear that the Lyons mine will, after all, wind up as a repository for used fuel rods from nuclear reactors — even though the federal government ostentatiously ruled that out in 1971.

If the fear sounds far-fetched, there are some facts that feed it. Consider:

- After years of study and the expenditure of millions of dollars on exploratory studies, the federal government still has not been able to select another potential repository site in bedded salt.
- Federal waste planners and private contractors have continued to produce conceptual studies of a salt-based repository using data from the Carey mine.
- The data the government has collected on storing intensely radioactive waste in salt comes almost exclusively from Project Salt Vault.
- Although the Energy Department insists that Lyons is not a candidate for the nation's first repository, there are someday to be other repositories, and Lyons could be nominated for one of them.

Despite the poor prospects for establishment of even one high-level waste repository, some Kansans remain convinced that Beierle's proposal to bury low-level nuclear garbage is

buried annually. By 1978, the volume had risen to 2.8 million cubic feet — a 65 percent increase.

And the volume will grow even more in the future. The Energy Department estimates that the nation will produce 5.9 million cubic feet of low-level waste by 1990, an amount significantly exceeding the capacity of the three currently operating commercial sites.

In addition to being sparsely populated, rural and eager for any new industry an outsider might bring, Lyons had a special attraction for Beierle.

The town was about 100 miles south of the geographic center of the continental United States, so a low-level waste site there would occupy an enviable central location in an industry where transportation costs are a major expense.

To win over Lyons, Beierle applied his patented brand of salesmanship and promotion.

On Aug. 31, 1977, Beierle and his wife, Vesta, bought a one-story brick house in Lyons, according to Rice County records. They registered to vote. Beierle hired the director of the local economic development board as an assistant.

He told townspeople that his proposal to bury low-level waste in the Carey mine would generate jobs for Lyons. He promised to locate other "business operations" in Lyons if the state approved his application.

And he offered to buy a parcel of land from the Chamber of Commerce, not because he needed it, but, as a local attorney representing Beierle explained in a letter to the group, "primarily to assist the Chamber financially."

Beierle's application to put nuclear trash in the Lyons mine illustrates the kind of confusion and controversy that attend low-level licensing.

The original application, filed on May 22, 1978, was made in the name of SouthWest Nuclear Co., a company incorporated in Texas and based in Pleasanton, Calif. Beierle helped found SouthWest Nuclear in 1973, and it is now headed by one of his associates, James L. Harvey.

SouthWest is one of the more active companies nationwide in the packaging and transportation of nuclear waste. Over the years, Beierle has served variously as president, chairman and chief executive officer.

When initial opposition arose in Kansas, SouthWest withdrew its proposal. Beierle incorporated Rickano, with himself and Harvey as officers and Beierle's female relatives as stockholders, and resubmitted the application under the Rickano name on Nov. 8, 1978.

Rickano — a contraction for the mine in Rice, and the state, Kansas, where the mine is located — first listed its address as 205 W. Commercial St., Lyons. The most recent records on file with the Kansas secretary of state's office give the address as 7066-A Commerce Circle, Pleasanton, Calif. That is also the address of SouthWest Nuclear.

From the start there was confusion about the type of low-level waste Rickano intended for the Carey mine.

The original application appeared to be quite specific on that point, stating:

"Radioactive waste materials will primarily come from hospitals, research institutions, nuclear power plants, naval shipyards and others who offer services to the nuclear industry." But when some concern arose among Kansans about waste from nuclear plants, Rickano changed its position.

In a Nov. 16, 1979, letter to Kansas authorities, Harvey, identifying himself as Rickano's vice president, wrote:

"We do want to make it clear that we intend for the Lyons Low-Level Retrievable Storage Facility to be an exclusive repository for institutional type radioactive wastes."

"Consequently, comparison to the types of facilities that are received at shallow land burial sites is not an accurate comparison, and this facility should be analyzed strictly on the basis of institutional facilities."

Another Beierle project is this pickup truck that runs on hay, wood, weeds and other trash; he and his brother once drove it cross-country

Pyrenco Inc. 40
SYN-GAS POWERED

Another Beierle project is this pickup truck that runs on hay, wood, weeds and other trash; he and his brother once drove it cross-country

Fredrick P. Beierle declined to be interviewed about his nuclear-waste business. A woman who identified herself as his wife told a reporter: "Newspaper people ... always like to edit something so that it's very negative."

Yakima, Wash. Herald-Republic



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FOREVERMORE

B & B workers, including Beierle and his two sons, were draining liquid from 12 containers of radioactive waste. The drums originally had been shipped by Consumers Power Co. from its Palisades nuclear plant near South Haven, Mich., for burial at Beatty, Nev. But when the drums arrived in Nevada, inspectors noticed fluid leaking from four containers and refused to allow the shipment to be buried.

The containers were taken to Southwest Nuclear's warehouse in Pleasanton, then trucked to B & B in Prosser, where the liquid was to be drained and solidified.

During the work, in which 57 gallons of radioactive fluid were removed, the inspector observed what he described in his report as a "lax attitude" toward the decontamination process. Although the workers had removed their gloves to enjoy some soft drinks, they were still wearing the "overalls and booties" they had worn while removing radioactive liquid from containers.

The company official who was monitoring radiation levels during the operation walked in and out of the restricted area "without checking himself for contamination," the inspection report noted. Lastly, B & B did not use all the required radiation-instrumentations.

Southwest Nuclear was cited for the violations on March 3, 1980. When the company told the state that it had taken "corrective" steps, no further action was taken.

The Beierle family comes to Texas for some selling and a dinosaur hunt. After Beierle's venture in South Carolina, he put down roots in another part of rural America in an effort to set up yet another nuclear burial ground. This time it was in Texas, in the dirt-poor county of Delta, about 75 miles north-east of Dallas.

Spliced into land between the north and south forks of the Sulphur River, Delta County had been losing population for more than half a century and was down to 4,500 when Beierle arrived in the summer of 1975.

To help bankroll his new venture, Beierle teamed up with a group of Dallas promoters who were principals in a business called Enntex Oil & Gas Co. Together they formed Southwest Nuclear Co., with the oil company's officers as directors.

Beierle brought his family with him and moved quickly to establish himself as part of the community. He opened accounts at two banks in Cooper, the county seat. He purchased furniture from a Cooper merchant. He opened an office a few doors from the Cooper town square. He and his family began attending services at the First Baptist Church. And he bought a new pickup truck.

"Everybody here has a pickup truck," said Grace Swenson, a local homemaker who opposed Beierle's nuclear-waste plan. "You do everything in your pickup truck. You hunt, you go to church in it. Even the young boys use them on their dates. He did try to fit in."

The location Beierle chose for his next burial ground was a 268-acre tract of rolling land in eastern Delta County. On this farmed-out parcel, he explained in an interview in a local newspaper, he planned to bury both chemical and "low-grade" radioactive wastes. After taking an option on the land, Beierle put to work his well-honed techniques to win over the county.

He paid a courtesy call on the county commissioners. He made the rounds of leading businesses and the Chamber of Commerce, explaining, as one person recalled, that he was "going to employ quite a few people at good salaries, and that this would help our economy."

He began appearing on the "Delta County

Hour," a radio program broadcast from Paris, Texas, 30 miles to the north. He bought space in the local weekly newspaper to publish a column called "Nuclear News."

"I dare say that if our present environmentalists and conscious society had been around when initial studies and bomb experiments were being conducted," Beierle wrote in one column, "I sometimes wonder if we would have ever exploded the first device and hence be unable to enjoy the immeasurable nuclear benefits we have today."

In another column he sought to point out the benefits of nuclear energy: "You all remember the news release about the first atomic bomb which was exploded over Japan and literally wiped out a whole city. Unfortunately this image is still with us today and many people envision the mushroom cloud whenever the word nuclear or atomic is mentioned. There are, however, a lot of benefits we enjoy from nuclear energy, but today I want to share with you some proposed work that will be done by using atomic bombs."

"For those of you who may be familiar with the use of dynamite to dig trenches ... the same result can be obtained by arranging them nuclear devices in a row then exploding them in the right manner. You can dig a very large canal, big enough to float ships over a great distance and through mountainous terrain, in a matter of minutes at relatively low cost."

As for his own project, "incarcerate" waste, Beierle wrote that "residue from various sources will be reclaimed for resale or placed in a geological environment that will contain the material for an indefinite time or until future technology will permit reclamation or reuse."

Delta County's plan sounded inviting to some arms for others. For once, he encountered mounting skepticism across the county over government and industry claims about the safety of radioactive-waste practices. A group calling itself Concerned Citizens for Delta County circulated petitions opposing Southwest Nuclear's plan. The group bought space in the local newspaper to publish columns rebutting Beierle's claims about nuclear

safety. The controversy even found its way into the pulp, as one minister denounced a Beierle opponent for allegedly slandering "this fine Christian man." Overnight, Delta County found itself deeply divided.

"It was a tooth and toenail battle," recalled Hiram Clark Jr., a county commissioner. "He (Beierle) is a real cool operator. He'd be what I would describe as a salesperson. He had a package to sell, and he almost sold it."

Indeed, even though more than half the county's registered voters eventually signed the petitions opposing the burial ground, and even though the county's commissioners went on record against it, Beierle still might have prevailed and secured a permit from the state had not another event sealed the project's fate.

On Nov. 20, 1975, the Texas attorney general filed a civil complaint in Dallas accusing Enntex Oil & Gas of selling unregistered oil and gas securities. The state contended that Enntex and its officers had "employed schemes or artifices to defraud or obtain money by means of false pretenses."

Three of those officers also were incorporated in SouthWest Nuclear. When word of the lawsuit reached Delta County, it was enough to finish off Beierle's once-grand design to place a nuclear-waste burial ground there. Although Beierle was not involved in the lawsuit, the fact that his business partners in SouthWest Nuclear were accused of securities violations damaged Beierle's campaign to secure public acceptance of the dump proposal, and he formally abandoned his plans in March 1976.

But Beierle did not give up on Texas. He still had hopes of persuading one of the poor, rural counties of northeast Texas to month after him land for a nuclear graveyard. A month after he closed SouthWest Nuclear's office in Cooper, Beierle opened religious book store called Delta Book and Bible Store in nearby Commerce, and from that inauspicious base began to search for another property.

It looked for a while as if he might end up in nearby Lamar County, which adjoins Delta on the north. Beierle held a series of meetings with local business leaders and politicians in April. He escorted a group to South Carolina to look at the Barnwell burial ground, which prompted one county official to say at the time:

signed to demonstrate the suitability of rock salt deposits for the long-term storage of solidified high-level radioactive wastes such as those from power reactor fuel reprocessing.

"At the end of the two-year program, sufficient data should be available on which to base a determination of the feasibility of using underground salt mines for the full-scale disposal of high-level radioactive waste."

The used fuel assemblies, which came from an AEC test reactor in Idaho, were lowered 1,000 feet by elevator to the mine floor, where they were met by a specially built trailer and tractor. The two vehicles had been taken apart, lowered piece by piece into the mine, and reassembled.

The tractor and trailer carried the assemblies to the test area, where they were monitored by instruments. The assemblies were replaced every six months with freshly used fuel to "insure a high radiation dose to the salt for determining the long-term effects of radiation on salt formations."

The volume of used fuel placed in the mine was small — minuscule, in fact, compared to the amount that would be put in a commercial-scale repository. Nevertheless, Salt Vault remains something of a benchmark in federal nuclear-waste planning. To this day it is the only study ever conducted in this country in which fuel rods were actually placed in a salt formation.

Not only is the Carey mine the site of the only such field test in salt, but the government has no plans to conduct another one — even though it is now committed to constructing a repository. In reality, it is unlikely that a repository will be built, because of loopholes in the Nuclear Waste Policy Act of 1982 that give states various ways to block such a project within their borders. Nevertheless, the act requires that the secretary of energy nominate five sites for a repository next year, and that three of them be recommended to the President for further study by Jan. 1, 1985. Then, by March 31, 1987, the President must recommend one site to Congress.

Even if the planning gets that far, the Energy Department does not plan to test used fuel rods or other radioactive waste at potential repository sites.

Critics of the Energy Department official in charge of the search for a potential repository site, explained why: "It is quite troublesome to deal with these [radioactive] materials. Whenever you can get away without doing it, you don't do it, and we wouldn't need to do it in these cases. We have already done enough tests."

In the Lyons experiment, the AEC monitored the used fuel packages implanted in the mine floor for about 18 months before removing the waste and going over the data produced by the tests.

In 1967, the commission pronounced Project Salt Vault a success, saying "it appears that this type of storage may provide safe and efficient ultimate storage for high-level radioactive wastes."

Three years later, in June 1970, the AEC designated the mine as the projected site for the nation's first high-level waste repository. Later that year, after reviewing Project Salt Vault data, the Committee on Radioactive Waste Management of the National Academy of Sciences endorsed the AEC's plan.

The committee's report said that "the use of bedded salt for the disposal of radioactive waste is satisfactory" and that "the site near Lyons, Kansas, selected by the AEC, is satisfactory, subject to the development of certain additional confirmatory data and evaluation." In 1971, the AEC received \$3.5 million from Congress to buy the mine, acquire an additional 800 acres around it, and prepare a conceptual design of the proposed repository, which Commissioner James T. Ramey confidently predicted would "last for centuries."

"There is a strong feeling in the Atomic Energy Commission," said Sen. John Pastore (R., R.I.), "that this is the proper place for storage because of the very nature and character of these salt formations which I understand are rather impervious."

The AEC dangled the prospect of a bounty of

economic benefits before Lyons if the facility were built.

"The projected full scale operation of the repository will require perhaps 200 employees," the commission said in its environmental statement. "It is possible that the presence of the repository may attract other commercial or nuclear related activities to this area."

If it had been left to the AEC, there might be a high-level waste repository in Lyons today. As it turned out, the project collapsed in 1971 because of other scientific findings.

The Kansas Geological Survey, which had been hired to make a final geological report on the site, came up with some disquieting conclusions.

The land above the mine had been heavily drilled for oil and gas, and some of the bore holes had not been properly plugged. Dr. William Hamblin of the state agency described the earth as "a bit like a piece of Swiss cheese." If water were to penetrate one of the old bore holes and seep into the repository below, radioactive brine could flow out and into nearby ground-water supplies.

It was also discovered that salt was not as resistant to water as had been thought. Less than a half mile south of the Carey mine, an active salt mine was in operation. The mine's owner reported that 175,000 gallons of water, which had been injected into the mine to dissolve salt for a new cavern, had never flowed back to the earth's surface as was expected.

The water had simply vanished, and no one knew where it had gone. Obviously, underground salt beds possessed mysteries that geologists did not yet understand.

Of even greater concern to the Kansas Geological Survey was the scientific approach used by federal officials and private contractors in assessing the suitability of the mine for high-level waste storage.

The state agency was especially critical of the Oak Ridge National Laboratory in Oak Ridge, Tenn., which was overseeing the project for the AEC. Kansas officials complained that the Oak Ridge scientists had not sufficiently researched the question of how heat

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from high-level waste would affect the surrounding salt and rock.

"The State Geological Survey regards solution of this problem as crucial to the safety of the repository site," the survey's director reported to Kansas Gov. Robert Docking in December 1970. "It has seemed to us at times that the AEC has been more interested in convincing the public of the safety of the Lyons site rather than using these funds needed to carry out studies to a conclusion."

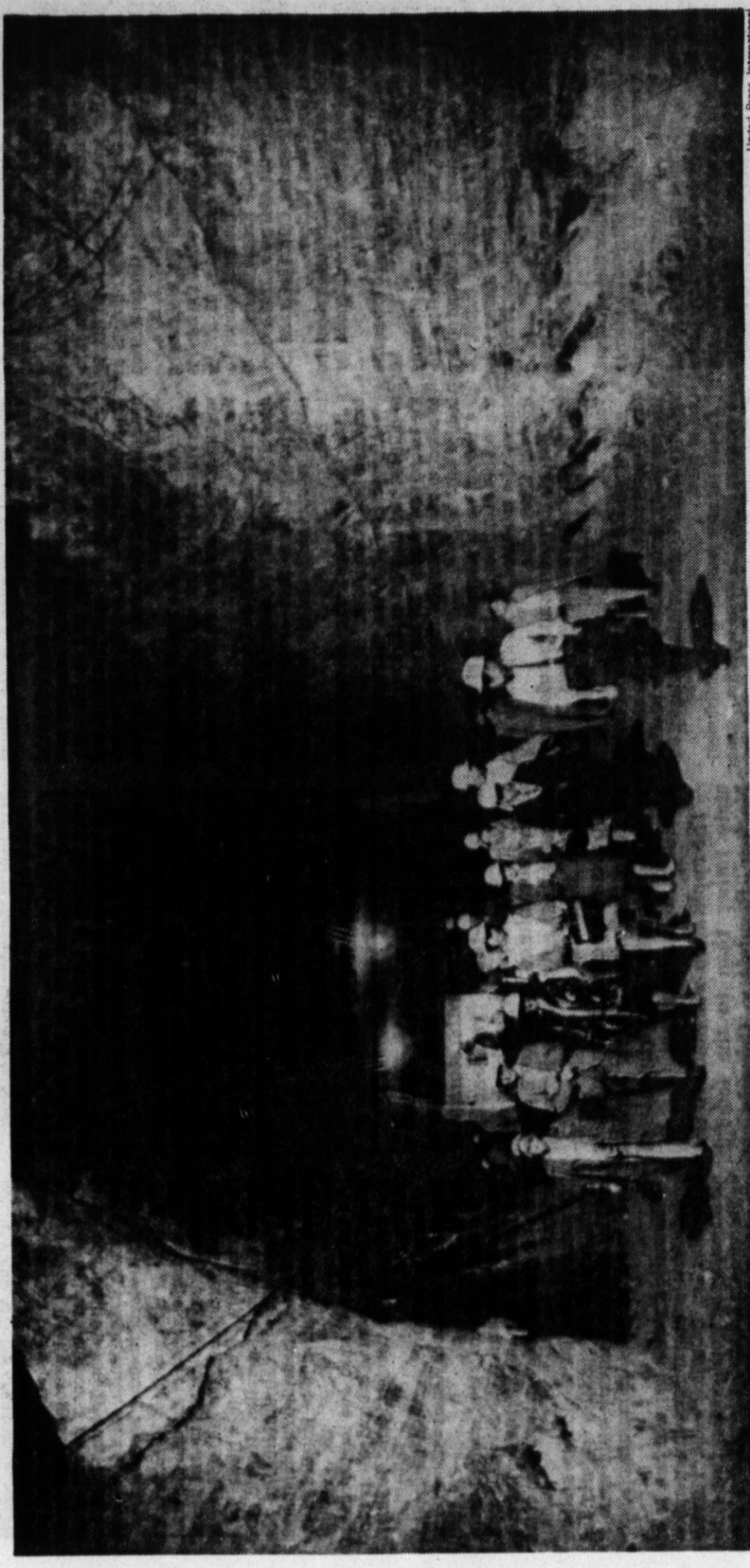
The disclosures, and the storm they provoked in Kansas, were enough to force the AEC to back away from Lyons by late 1971, and to begin looking elsewhere for an underground site.

Fred Beierle arrives with a plan for the mine that has many confused. Lyons found its experience with federal waste planners disillusioning, the town has been nearly as bewildered by what Beierle has proposed for the Carey mine.

Beierle arrived in Lyons in the spring of 1978, when the government and the nuclear industry were becoming concerned over a looming shortage in low-level waste burial capacity.

Three of the nation's six commercial nuclear dumps had closed in three years. At the same time, the volume of low-level waste being generated was soaring.

In 1975, when all six operations were functioning, 1.7 million cubic feet of waste was



In 1970, Lyons residents toured the tunnel where high-level radioactive waste was to go; now, many oppose putting nuclear waste in the mine

The federal government tells communities that radioactive waste . . .

Valley plant and given it to local residents to spend as they pleased.

Kentuckians, too, were once promised jobs and new industries if they would go along with a nuclear-waste garbage dump in the state.

After a private company proposed a low-level-waste burial ground at Maxey Flats in 1962, state officials endorsed the bid and stressed the economic advantages the dump would bring.

"The biggest problem faced by the atomic industry is waste disposal," said James N. Neel Jr., director of the Kentucky Atomic Energy Authority. "Therefore, this site is of basic importance to Kentucky. Its location here is expected to attract a number of atomic plants to this state."

Maxey Flats went into operation in 1963, and about 4.7 million cubic feet of radioactive waste was buried there over the next 14 years. It was shut down in 1977 after health officials found that radioactivity kept seeping off the site.

County's largest community," claimed the Solomonia (N.Y.) Republican-Press.

The newspaper added that the plant eventually would make the village of West Valley, 30 miles south of Buffalo, an "urban area with a population of 24,000 . . . within 10 to 20 years."

None of these predictions came true. Employment at the reprocessing plant peaked in 1968, when the work force totaled 264. In time, the number dwindled to 50.

Plant expenditures topped out at \$5.6 million in 1971. The total of the real estate taxes paid by the plant operator to town, county and school district was less than \$1 million.

From 1960 to 1980 the population of Cattaraugus County increased only slightly, from 80,187 to 85,697. West Valley is still a village with a population of about 400, unchanged from the early 1960s.

Although the sales pitch sounds a lot like Frederick P. Beierle, the supersalesman of nuclear waste, the pamphlet was written and distributed by the U.S. Department of Energy.

In doing so, the department was simply resorting to a longstanding practice of nuclear-waste promoters, both public and private: extolling the economic benefits of nuclear waste to counteract fears about the radioactive material. But the jobs have never materialized.

One of the first and most successful of the waste-for-jobs promoters was the late Nelson A. Rockefeller, former governor of New York. Rockefeller employed this approach in 1963 when he presided at the ground-breaking for a private plant at West Valley, N.Y., to reprocess highly radioactive fuel rods from commercial power plants. Said Rockefeller, who had led the campaign for the plant:

"Its greatest importance is attracting new industry to this area. It places New York in the forefront of the atomic age now dawning and will make a major contribution toward transforming the economy of western New York and the entire state."

Local newspapers quickly picked up on the theme. "The world's first privately owned, nuclear fuel reprocessing plant may spark the growth of this tiny rural town into Cattaraugus

But promised jobs just don't come

By Donald L. Barlett and James B. Steele Inquirer Staff Writers

When an underground nuclear-waste burial vault was proposed for a rural county in northwest Texas, a pamphlet touting the benefits was distributed to residents.

"Preliminary estimates are that construction employment will peak at about 1,700 to 5,000 persons within about four years," it said. "Following construction . . . employment will subside to . . . 870 to 1,100 persons for 30 years. Direct purchases of goods and services are expected to create an additional 1,800 service jobs. New workers may increase the long-term population growth of the area."

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Nolan Edwards, brother of Louisiana Gov. Edwin W. Edwards, to help form a Louisiana corporation.

On Jan. 28, 1977, Beierle set up Southwest Environmental Co. Inc. (SWECO), listing himself and an attorney in Edwards' Crowley, La., law firm as the registered agents.

To help locate a site, Beierle called upon another brother of the governor, Marion D. Edwards, who owned a real estate company in Crowley.

The site turned out to be a 383-acre tract near the town of Livingston (pop. 1,500), about 25 miles east of Baton Rouge, the state capital. Beierle set up an office and had stationary printing carried by the SWECO slogan: "Preserving Our Bountiful Heritage Through Sound Environmental Practices."

With Marion Edwards at his side, Beierle appeared before the Livingston Parish police jury, the Louisiana equivalent of a county council, early in 1977 and outlined his plan to build a chemical-waste disposal operation on land a mile south of the town. Beierle said the project would create jobs and bring business to the parish.

Whether his proposal for a chemical dump was a step toward ultimately burying nuclear waste is not clear. In South Carolina, Beierle originally had talked about a chemical-waste operation at a site near Barnwell that later was licensed for the burial of low-level radioactive waste.

Nick Ercy, who was mayor of Livingston at the time, recalled in an interview with an inquirer reporter how Beierle secured the support of parish officials: "I don't think they knew what the meeting was about until they got there. At the time Marion Edwards was the brother of the governor and in a position to influence the police jury. And he gave them a real good job job."

"The people of Livingston were entitled to a hearing, but by the time they found out about the meeting two weeks had gone by and it was too late. They like the police jury got a snow job and they knew it, and most of them admitted it later."

After the meeting with Beierle and Edwards, Livingston Parish officials sent a letter to the Louisiana Department of Health and Human

the claim of human origin. This trail has some of the signs of our theoretical dinosaur tail drag. ... The long, short, long, short, long nature of the stride, and the fact that print 1 points to print 2, and 3 points to 4, and 5 points to 6, while between prints 2 and 3, and 4 and 5 the stride is rather short with a shallow rut between the toe of one and the heel of the next leads one to think of these as more 'dinosaurian' than human."

Livingston, La., learns that toxic chemicals and water don't mix

With his hopes for establishing a nuclear-waste dump in Texas dashed, Beierle began to scout for a similar location in another state.

He was backed again by the interests that had bankrolled him in Texas, including oilmen who had been accused of selling unregistered oil and gas securities in the Enntex case.

In the wake of the attorney general's complaint, Enntex was dissolved. Some of its officers then founded a new company called Spindletop Oil & Gas Co., operating out of the same Dallas offices as Enntex.

Late in 1976, Beierle teamed up with Spindletop to try to establish a hazardous-waste burial site, this time in Louisiana. Court records show he received a \$47,000 advance from the company.

Once in Louisiana, Beierle lined up potent political support. He retained the law firm of

"I didn't see anything with my own two eyes I was concerned about." But opposition quickly arose in Lamar County as well, leading the county commissioners to go on record unanimously opposing to Beierle's plan. And when it was rumored that Beierle was cycling nearby Fannin County for a similar proposal, the commissioners there also voiced their opposition. For one of the few times in his life, Fred Beierle's ability to sell had failed him.

The Texas period was not a complete loss for Beierle. It brought him close to a meandering muddy stream known as the Paluxy River, located about 60 miles southwest of Fort Worth.

Working through flat, unappealing terrain, the Paluxy is not high on the list of America's scenic rivers. To Beierle, it had another appeal. The river has periodically yielded some curious fossils — huge tracks thought to have been made by dinosaurs and other indentations that resemble human footprints.

The fossilized tracks have made the Paluxy a mecca for archaeological expeditions by fundamentalist religious groups that see in the tracks hard evidence to refute the theory of evolution.

If the tracks were indeed made by dinosaurs and humans at the same time, they would cast doubt on evolutionary theory, which holds that dinosaurs evolved and died out millions of years before man appeared on the earth.

Beierle is a creationist. He believes that all life forms, including man and dinosaurs, once lived at the same time, but that the reptiles could not adapt after the biblical great flood and died out. The Paluxy, with its rich fossil lore, was thus a logical region for him to explore.

During a lull in the Delta County battle in 1976, Beierle led his first expedition there. He rented a backhoe and enlisted family members to help dig for dinosaur and human tracks along the river bank.

Beierle later wrote and published a book about his Paluxy expeditions called *Man, Dinosaur and History*, which was distributed by the Bible-Science Association of Minneapolis. In the book, Beierle described the method he and his family used in the search for fossil tracks.

concentrated radioactive materials and storing it in an underground repository. If for some reason reprocessing did not take place, it was assumed that the government simply would place the fuel rods in canisters and store them in the underground repository. For electric utilities, the repository was considered essential.

Each year, from one-fifth to one-third of the fuel rods are removed from a reactor and fresh ones inserted. The old rods — which are intensely radioactive — are placed in water-filled pools made of reinforced concrete and lined with stainless steel.

The water is necessary both to absorb the radiation from the rods and to keep them cool. If they were not cooled during their first years out of the reactor, they would melt down and cause an explosion, showering the surrounding area with radioactive particles.

When utilities began building nuclear power plants, they designed the storage pools to hold only a limited number of fuel rods, because it was assumed that the government would eventually take the rods off their hands.

That was one of the reasons Project Salt Vault was launched. In those days, scientists believed bedded salt was the geologic formation best suited for the storage of high-level wastes.

Salt was highly regarded for several reasons: the deposits had been in place for 200 million years; they were dry and, it was believed, resistant both to earthquakes and to water seeping in from the outside.

Because of its plasticity, salt is capable of sealing fractures and changing shapes. And since all formations were found deep in the earth, salt also afforded a secure way to isolate the waste from man, animal and nature.

In 1965, as part of Salt Vault, a small number of metal canisters containing used reactor fuel were placed in 12-foot-deep holes bored into the floor of the Carey mine. A number of other canisters, electrically heated to high temperatures, were put there too.

The Atomic Energy Commission's 1965 annual report explained the purpose: "This two-year experimental project is designed to identify the remaining solution of highly concentrated radioactive materials and storing it in an underground repository."

How Lyons learned to distrust attempts to sell it on nuclear waste

Lyons did not always feel this way about radioactive waste.

That it does now is a reflection of how past mistakes by nuclear-waste professionals have made average citizens increasingly wary of their claims. The cycle that has moved people from trust to distrust is much in evidence in Lyons.

When the Atomic Energy Commission (AEC) began studying the old Carey mine as a possible high-level waste repository in the 1960s, the town encouraged and supported the program.

Lyons residents believed that the project would create jobs and stimulate the local economy. More importantly, they had faith that the federal government knew what it was doing.

"I trust my government," a Lyons banker told a correspondent of the New York Times in 1971, explaining why he supported the repository project. Another businessman said "trustworthy" but "good guys, good neighbors."

AEC technicians had begun seriously studying the mine for high-level waste in 1963 as part of a program called Project Salt Vault.

Government plans then called for reprocessing the used fuel rods from commercial reactors. Reprocessing is a method of dissolving the rods in a chemical solution, extracting the usable plutonium and uranium, and then solidifying the remaining solution of highly concentrated

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as to why people in Washington own stock in a company trying to put low-level waste in an abandoned salt mine in rural Kansas.

Some are relatives of Fredrick P. Beierle, the nation's nuclear-waste supersalesman. Radioactive dumps established by Beierle account for 98 percent of the nuclear waste buried today at commercial operations.

For 20 years, Beierle has made a career of showing up in small towns across America, preaching the benefits of nuclear energy and seeking approval of radioactive garbage dumps.

Over the years he has teamed up with an assortment of backers to finance these ventures, including an apple orchardist, the owners of a drive-in restaurant and men who turned out to be sellers of unregistered oil and gas securities. But in Lyons, Beierle's latest undertaking is very much a family affair.

Mrs. Farrens is his mother-in-law. Mrs. Rat-tray and another shareholder, Jennifer Bur-rell, are his daughters. Mrs. Graff, although she says she has never owned any Rickkano stock, is a cousin of Beierle.

The old Lyons salt mine, the object of Beierle's latest marketing effort, was worked by the Carey Salt Co. from 1891 to 1948. In that period, about 20 miles of tunnels were carved out of the salt.

The existing mine, which takes up only a fraction of the salt formation beneath Lyons, is big enough to hold all the low-level radioactive waste that has been buried at the nation's commercial sites over the last two decades.

The mine is part of the Permian salt basin, a kidney-shaped deposit stretching in a great arc from central Kansas through parts of Oklahoma to the Texas panhandle. The formation, which runs from 1,000 feet to a mile below the surface, is considered one of the richest veins of bedded salt in the nation.

Beierle, who spent the first 15 years of his low-level-waste career persuading small towns that shallow land burial was perfectly suitable for this kind of nuclear garbage, now claims it is not the "best" way to handle such wastes. A news release distributed in Lyons after the

... will bring jobs — and it's a tempting prospect for depressed areas

partment downplays any potential dangers in the repository: "DOE and its predecessor agencies have had thousands of man-years of experience managing radioactive waste and maintaining health and safety programs to reduce the risk of radiological releases to levels as low as reasonably achievable."

"The technical experts generally agree that the geologic disposal method is technically sound and the concept that will be available the earliest."

The department's promotional booklet, however, does not mention other federally funded studies that have concluded that a repository would pose a hazard to humans and the environment.

A study made in 1978 for the Environmental Protection Agency (EPA) by Arthur D. Little Inc., the nationally known Cambridge, Mass., consulting firm, concluded that some deaths would almost certainly occur during the life of a repository from human intrusion or from seepage of radioactive materials into groundwater.

A follow-up report by the EPA materials to say about a salt repository: "Each type of reference salt repository would cause about 200 health effects, almost all of them premature cancer deaths."

The study defined "population health effects" as "fatal cancers and genetic effects."

opment has had a strong appeal in two Texas counties, Swisher and Deaf Smith, near Amarillo. The Energy Department has drilled test holes into a salt formation underlying the two counties to determine if it might be used to bury highly radioactive waste.

Sparsely populated and rural, Swisher and Deaf Smith are heavily dependent on agriculture and related industries, and are constantly seeking to diversify their economies.

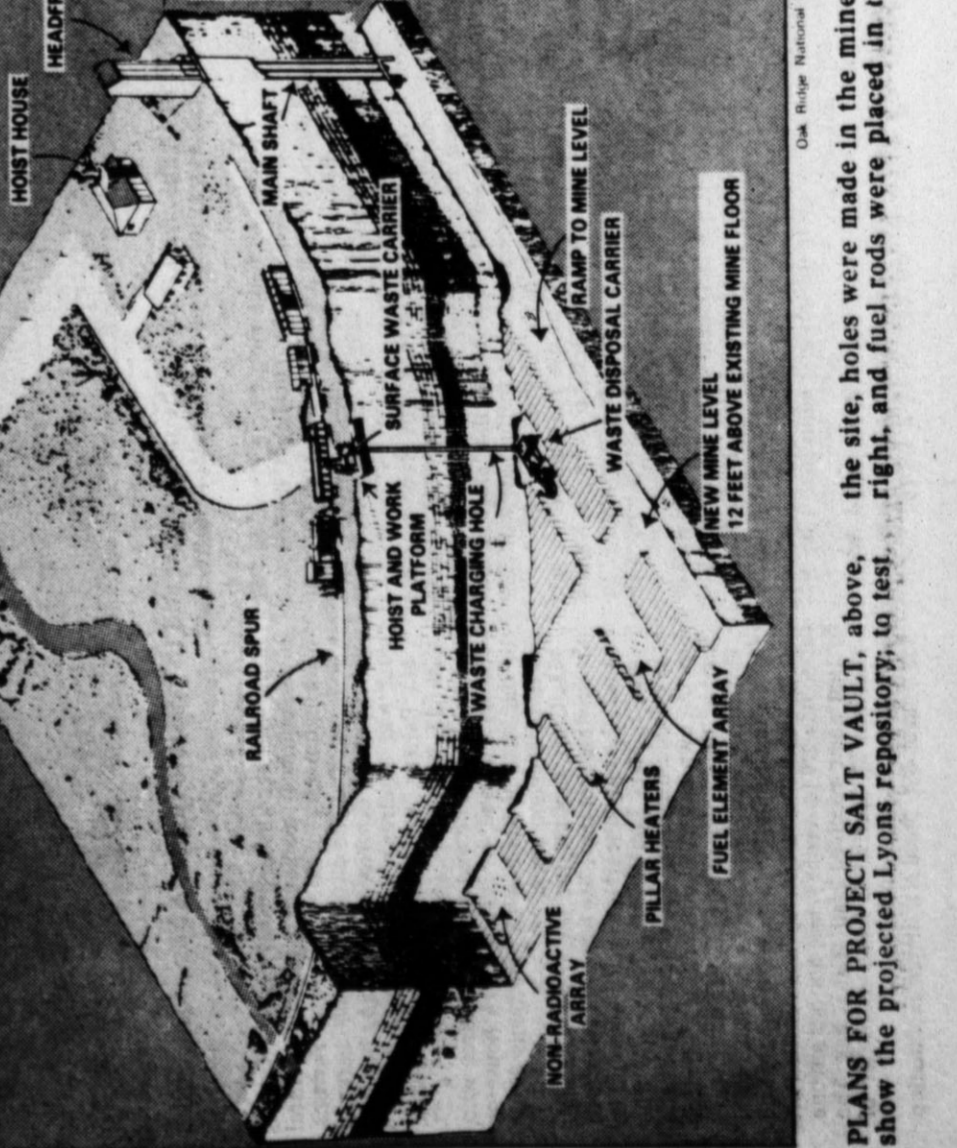
In addition, the two are among the poorest counties in Texas (19.3 percent of Swisher's families and 14.3 percent of Deaf Smith's are below the poverty level), and so the Energy Department found a receptive audience when it promised jobs and fat payrolls for the area selected for the repository.

When some local opposition arose to the department's drilling project, the agency sent officials into the two counties to sell residents on the concept.

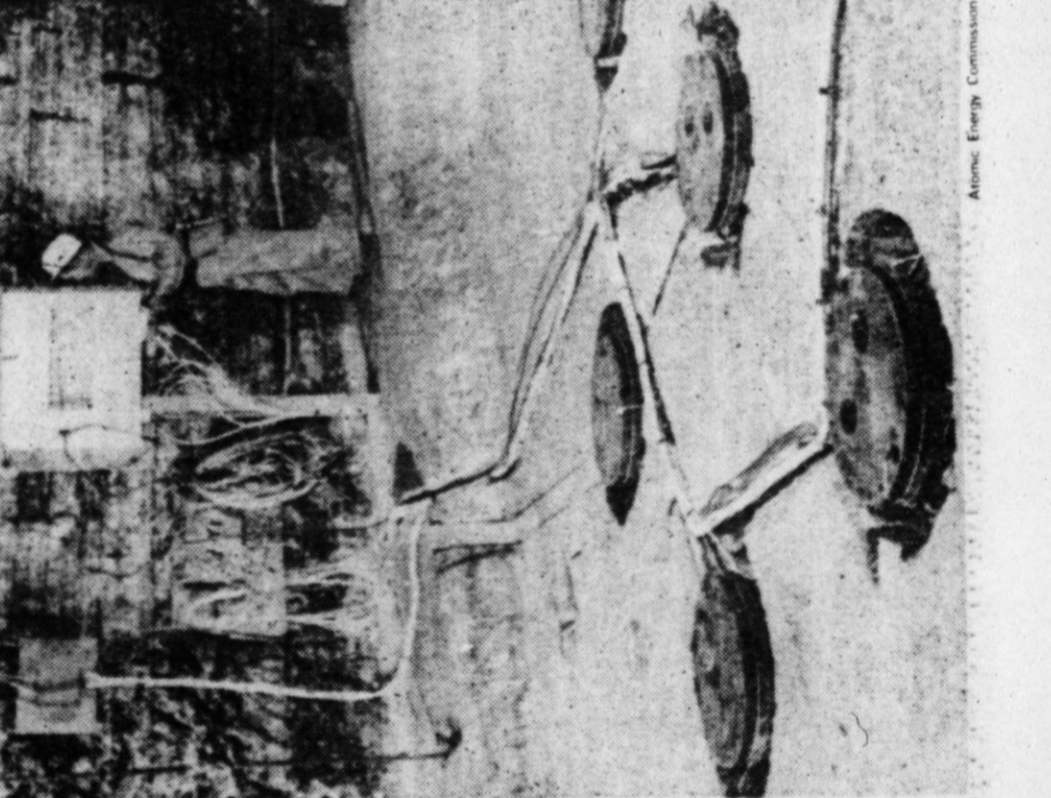
"They did a real good selling job, especially on what it would do for the economy," said Wendell Tooley, publisher of the *Tulia Herald*. "This was the first time we'd got the positive side, up to now we'd just heard the scary stuff. But afterward, lot of townspeople were saying things like, 'Well, the government's not going to do anything that'll hurt anybody, so let's let them come on in.'"

While promising jobs, commerce, new public facilities and more tax revenues, the department has had a strong appeal in two Texas counties, Swisher and Deaf Smith, near Amarillo. The Energy Department has drilled test holes into a salt formation underlying the two counties to determine if it might be used to bury highly radioactive waste.

Project Salt Vault in Lyons, Kan.

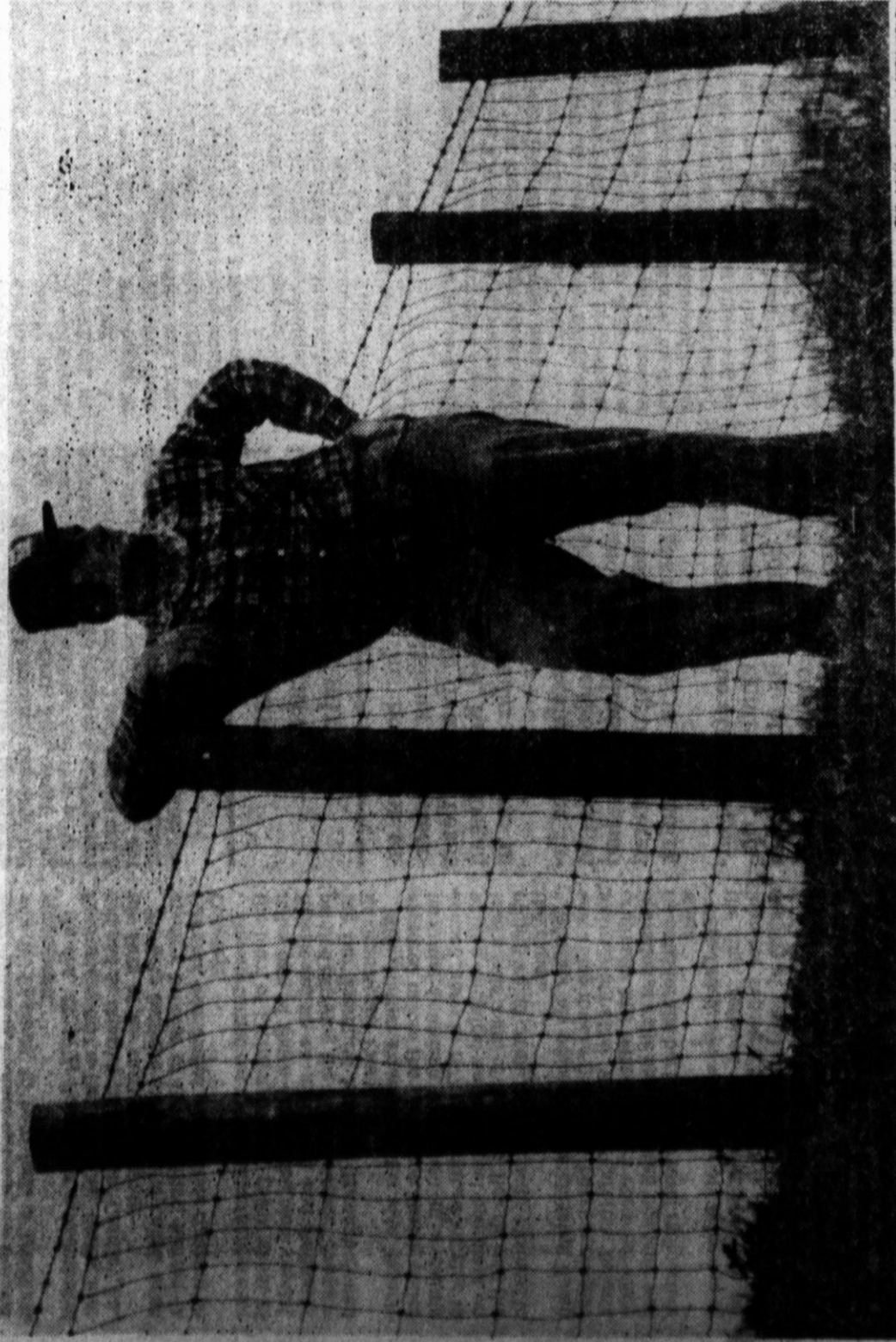


PLANS FOR PROJECT SALT VAULT, above, the site, holes were made in the mine floor, right, and fuel rods were placed in them.



Atomic Energy Commission

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Farmer Harold Schieler at the fence between his land and the Sheffield dump, radioactive tritium has escaped the burial site

Resources saying they did not object to SWECO's plan. The letter was not an official endorsement but an indication to state officials that the project was not locally opposed. It helped pave the way for state approval in February 1977, and Beierle purchased the land the next month for \$396,966, according to Livingston Parish records.

Erdley, the former mayor, recounted Beierle's next moves.

"He started attending the local church. He gave the impression he wanted to be part of the community. He invited me to take a tour of the plant [burial site]."

"They had one hole dug with some barrels in it. He told us how they were going to put a layer of topsoil over it and then plant trees. Make it look just like it used to. He said they were going to reserve the part of the property next to Interstate 12 and Highway 63 for residential development. He painted quite a picture. If you came by that place today, you would ask yourself who would ever want to live next to that dump."

Rather than generating many jobs for Livingston, Beierle's dump created a civic liability. The burial ground was built on land that sloped gently toward streams that eventually flowed into Lake Pontchartrain, which borders the northern city limits of New Orleans.

The area is one of the wettest in the nation, receiving an average of 66 inches of rain a year. Later studies showed that the water table under Beierle's toxic-waste dump was only five to six feet from the surface in some places.

The study also turned up the existence of sand layers running through the site only a few feet from the bottoms of burial pits, meaning that a pathway existed along which contaminants could be carried off to groundwater supplies.

The SWECO dump was plagued by problems soon after it opened in August 1977.

Less than two months after burials began, a Louisiana state official found violations during a routine inspection. A state health officer formally reprimanded Beierle by letter on Sept. 27, 1977.

Nuclear Waste in America

pit operations to keep out water.

In 1981, in a lawsuit filed in U.S. District Court in Dallas, Browning-Ferris contended that the "land farm" Beierle had established was "improperly constructed and could not be brought in compliance with generally accepted land farming principles."

After taking over the site, Browning-Ferris said it discovered that several of the pits were "leaking" hazardous wastes. The company demanded that SWECO "repair the leaking cells," but Beierle and his Dallas partners refused to do so, forcing Browning-Ferris to pay for the work. The lawsuit is still pending.

By the time of the court action, of course, Beierle had already left Louisiana and was at work trying to set up yet another nuclear garbage dump.

To the people of Prosser, Wash., Beierle is something of a curiosity, a charming, engaging figure and sometime imaginative inventor.

"Fred's a dreamer," said one businessman. "But I guess it's the dreamers who make the discoveries. They don't always succeed, but sometimes they hit the jackpot."

Beierle is now promoting the gasifier that converts agricultural wastes, refuse and other materials into synthetic gas.

The gasifier and the chemical process that produces the conversion are the brainchild of Dr. Donald E. Chittick, a former professor of chemistry at George Fox College in Newberg, Ore. He and Beierle were brought together in 1976 at a convention of creationists in Minneapolis.

Chittick lectures about creationism on college campuses and radio. According to accounts in a local newspaper, his belief in creationism was the spark that ultimately led him to discover the gas-conversion process.

Like other creationists, he believes that the geological layers of the earth date from the flood of Noah. Oil, coal and other hydrocarbons, he contends, were created by a catalyst in the earth that was present at the time of the flood. Chittick said he set out to discover this catalyst and believed he had done so.

He and Beierle formed a company called Pyreco Inc. in 1979 to promote and develop the gasifier.

For his part, Beierle is marketing the gasifier with the same evangelistic zeal he brought to nuclear waste.

"Every time you talk to him about the work he is doing in energy," says a Beierle observer in Prosser, "he always manages to link it up with the Lord. To Fred you can't talk about one without mentioning the other."

So far, Beierle has managed to get the gasifier placed in a U.S. Forestry Service greenhouse at Carson, Wash., for an experimental test run. He is negotiating a contract with a rural Michigan county to build a 3-megawatt electrical generating plant fueled by scrap wood.

The power plant is intended to be the focal point of an industrial-development project in the county. Money will come from the U.S. Department of Housing and Urban Development, the state of Michigan and industrial revenue bonds.

Does this mean, then, that Fred Beierle, the nation's foremost salesman of nuclear-burial grounds, has moved on to another calling? Not quite. For as Beierle travels about the nation preaching the benefits of the new gasifier, he is also waiting. He has found another site — an abandoned salt mine — in another small town — Lyons, Kan. — and has applied to another state government for permission to bury radioactive waste.

Beierle's wife confirmed that the application was still pending.

"Of course it's still pending," she said. "As far as I know it is the only application pending in the United States. Yet Kansas refuses to act on it."

"I don't know what the industry is going to do if something doesn't happen. I don't know what is going to happen to nuclear medicine. I don't know what is going to happen to power plants."

Everyone's favorite site for a dump

An abandoned salt mine in Lyons, Kan., is the lure

With its well-tended frame houses, red brick streets and stores ringing a courthouse square, the central Kansas town of Lyons could pass for a scene in a Norman Rockwell painting.

In Lyons, where talk of wheat prices takes precedence over world events, radioactive waste is a topic that should be of scarce concern to the 4,000 residents.

After all, Kansas ranks near the bottom (43d) among states producing low-level radioactive waste. And it does not yet generate any high-level waste; its first nuclear plant, the Wolf Creek reactor near Burlington, is not scheduled to go on line until 1985.

Nevertheless, nuclear waste is a recurring issue in Lyons — a subject that periodically mobilizes the town, then goes away, only to return to galvanize the citizenry anew.

This is because Lyons has an abandoned salt mine that exercises an irresistible lure on those who are perennially in search of places to bury radioactive garbage.

Twenty years ago it was the federal government that sought to put high-level radioactive waste in Lyons' old salt mine. Today, a private company wants the site for low-level waste.

The first attempt to use the site for radioactive waste began in 1963. For eight years, until 1971, the government pinned its hopes of establishing an underground repository for intensely radioactive high-level waste on the Lyons mine.

It dispatched teams to study the salt formation, to place used fuel rods in the mine floor to gauge the effectiveness of the storage site, and to analyze the resulting reams of data.

In 1970 on the basis of those tests, the Atomic Energy Commission announced that the Lyons mine had been tentatively selected for the nation's first repository.

The project collapsed a year later, however, when Kansas authorities pointed out a rather noticeable geological flaw that somehow had eluded federal officials in eight years of study: The earth above the mine was pockmarked by old oil and gas bore holes, which meant that water might be able to seep into the mine and carry off radioactivity.

Now the old salt mine at Lyons is being talked of again as a nuclear waste center, only this time for low-level waste — a prospect that has many townspeople apprehensive after their initial encounter with nuclear planning in the 1960s.

The nuclear trash, labeled "low-level" in-cludes materials ranging from slightly contaminated hospital clothing and laboratory equipment to highly radioactive sludges from nuclear reactors. Overall, it is certainly less hazardous than the used fuel rods churned out by nuclear power plants, but the management



OUTSIDE THE FORMER CAREY MINE in Lyons, Kan., the mine's past and its possible future: A box of salt and a retired caretaker, Clarence Bradford, displays symbols of radiation zone sign.

of low-level waste has been plagued by serious problems.

As the Inquirer's investigation has shown, the federal government abdicated most of its regulatory authority over burial of this waste in the early 1960s.

The government turned over the task of locating sites and constructing burial grounds to private companies. It left undecided the thorny question of who would pay if environmental problems later arose at one of the operations.

And it allowed long-lived radioactive substances such as plutonium to be buried at commercial graveyards for years before the practice was deemed a potential health hazard.

As a result, the nation's commercial low-level burial system grew up haphazardly, without any central control, and with decisions to establish nuclear garbage dumps based on faulty scientific premises.

By the late 1970s, the shortcomings of that policy were evident: Three of the nation's six low-level garbage dumps shut down after radioactivity leaked out of defective earth trenches, leaving federal and state taxpayers saddled with multimillion-dollar cleanup bills.

Along with her husband, also retired, she lives in a one-story frame house in the south-central Washington city of Richland. Mrs. Farrrens, who is listed as the owner of 89,000 shares of Rickano stock, described herself and her husband to an Inquirer reporter as "poor people."

J.L. Ratray, Rt. 3, Box 3421, Kennecott, Wash., J.L. Ratray is Janice L. Ratray, a 27-year-old housewife and mother of three who, with her husband, lives in a ranch house on the outskirts of Kennecott. She owns 80,030 shares of Rickano stock.

M.L. Graff, Box 186, Prosser, Wash. Although it is possible that there are other M.L. Graffs in Prosser, the only one in the area who could be located is Mary Lou Graff, a housewife who lives outside the town, and who says that she does not own any Rickano stock. M.L. Graff is listed as the owner of 90,023 shares.

M. Murray, Box 279, Grandview, Wash. Postal officials in Grandview (pop. 3,500) say that no one by the name of Murray has rented Post Office Box 279 in recent years, nor has anyone by that name received mail at that box. The mysterious M. Murray is listed as owner of 90,030 shares of Rickano stock.

As it turns out, there is a simple explanation

To deal with the burgeoning crisis, in 1980 Congress passed the Low-Level Radioactive Waste Policy Act, a bill that Rep. Tom Corcoran (R. Ill.) in a comment typical of congressional enthusiasm, described as "an excellent piece of legislation."

But a close look at the Lyons proposal — the only low-level waste operation to be considered since passage of the 1980 act — suggests that many of the problems that plagued low-level waste management in the past will continue to do so in the future.

The application to use the abandoned salt mine was filed by Rickano Corp., a Kansas corporation. The company began operations in a rented office on the Lyons town square with a stockholders equity of \$131,985.

That is less money than is ordinarily invested to open a McDonald's hamburger stand.

According to papers filed with the Kansas secretary of state's office, the company had 10 stockholders, seven of whom were identified only by their initials and addresses. They included:

M.F. Farrrens, 707 Sanford, Richland, Wash. M.F. Farrrens is Mary Farrrens, who is identified in local city directories as a retired nurse.

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safety of the public due to potential exposures to radioactive materials.

Furthermore, the NRC accused Applied Health Physics of engaging in "chronic non-compliance (that) indicates a careless disregard for the public health, safety and interest."

In an order issued in December 1980, the commission directed the company to arrange for the "immediate transfer" of most waste in its possession, and to accept no further shipments.

At the same time, the NRC proposed a permanent ban on the company's collection of radioactive waste, which would effectively put it out of business.

In a letter dated Jan. 27, 1981, Gallagher advised the NRC that the company had implemented "corrective measures which we believe will prevent our being vulnerable to this situation again."

Two months later, the commission, noting that the company's corrective measures would bring it "in compliance with commission requirements," lifted its previous order and allowed Applied Health Physics to resume its waste collection and storage operations.

Among the proposed changes in the company's procedures, an increase in storage capacity from 60 to 150 barrels.

Utilities, too, prepare to store large amounts of low-level garbage

Nuclear-waste brokers like Applied Health Physics are not the only companies that have increased their temporary storage capacity, a trend that further obscures the government's low-level waste statistics.

Electric utilities, which already are committed to storing extremely radioactive used fuel rods for decades, are girding for the probability that they will also be compelled to store low-level waste for years.

As a rule, when utilities accumulate enough low-level waste to fill a truck, they immediately ship it to a burial ground. Storage at a reactor seldom exceeds a few months. Now utilities are laying plans for storing the waste up to five years.

Two utilities, after going through formal NRC licensing procedures, have erected specially designed low-level waste storage buildings next to their nuclear plants.

The Tennessee Valley Authority (TVA) put up two storage buildings, one at its Browns Ferry plant at Decatur, Ala., and another at its Sequoyah plant at Dabney, Tenn.

These two utilities are the only ones with licenses to store low-level waste — but they are far from the only ones planning to store it.

greater.

This, then, is the history compiled by the scores of agencies and departments of the federal government and the 50 states that are charged with regulating some aspect of low-level radioactive waste.

They don't know how much is produced because they don't count it — either its volume or its radioactivity. They don't know all the places it is stored. They don't always know where it is dumped.

They don't know the locations of all the buildings and properties that have been contaminated by radioactive materials.

They have successfully tracked down as little as 1/5 of one curie of radioactive material that dripped along a highway. But they have lost tens of thousands of curies in low-level waste and never noticed, nor can they explain the apparent disappearance.

And they have lost hundreds of pounds of enriched uranium and plutonium that could be used to build atomic bombs.

They have authorized construction of new temporary storage facilities, and increased storage capacity at existing facilities, because after 40 years they still don't have a comprehensive waste-management system in place.

State of nuclear-waste policies better than the federal government's failure to say what low-level waste is.

Incredibly, although this kind of waste has been produced since the early part of the century, the federal government has never come up with a specific definition of it.

That omission has enabled politicians, government workers and industry representatives to obscure the potential hazard — indeed, to pretend there is none at all.

Why the U.S. failed to define the term 'low-level' waste

Like so many of the other failings of nuclear-waste programs in the 1980s, the lack of a definition is traceable to the early days of the atomic age.

After the production of the first nuclear bombs, the Atomic Energy Commission lumped all radioactive waste into two loose categories.

It designated all other waste as "low-level," implying that it was essentially harmless.

Government and industry officials said time and again that low-level waste consisted of mildly contaminated clothing, laboratory equipment and other items that had come in contact with radioactive materials.

In 1963, the Atomic Energy Commission described it as "solids, liquids and gases with radioactivity levels in concentrations so low as to present little or no problem of radiation safety protection. Very often, these are industrial wastes which are contaminated only slightly with radioactivity."

In 1971, when Chem-Nuclear Systems Inc. was in the process of establishing a low-level burial ground at Barnwell, S.C., a company official assured area residents:

activity and normally do not present significant environmental hazards."

In 1979, Rep. Mike McCormack (D, Wash.), a nuclear enthusiast who was given to wandering about Capitol Hill with a Geiger counter to show that radiation was everywhere, gave one of his periodic demonstrations during a House Science and Technology subcommittee hearing.

To illustrate the insignificance of low-level waste, McCormack had this exchange with Washington Gov. Roy, himself a nuclear expert who once served as chairman of the Atomic Energy Commission:

McCormack — Gov. Roy, I would like you to comment on a problem that keeps perplexing me. That is the problem of double standards. We have a lot of double standards with respect to the nuclear industry, but I have brought in my Geiger counter, which I now have operating. It will make an occasional click for the audience.

I have a radioactive substance in my hand I will hold up to it. That is reading about one millirem per hour, which is far higher than most of the bulk of a low-level waste that is being shipped around the country.

McCormack — This is bought at the local hardware store in Washington, D.C., or Washington state, or anywhere else. It is a mantle for a Coleman gasoline lantern. Anybody can go down and buy one, or all you want of them. And they are far more radioactive than most of the low-level waste being shipped around the country.

Ray — Yes, sir. The same thing can be said for smoke detectors. Smoke detectors, saving so many lives in private homes, are far more radioactive than most of the low-level waste.

In 1980, the Energy Department provided this explanation of low-level waste in an information booklet distributed to the public:

"Low-level radioactive wastes are ordinary industrial and research wastes that have been contaminated in some way with a radioactive substance. These wastes contain very small amounts of radioactive elements."

In truth, much of the waste classified as low-level does pose little serious health risk, if handled properly. That is the kind of waste the experts talk about publicly.

But some of the waste designated as low-level is deadly. The experts seldom mention that kind.

Excerpts from two government documents, written more than a decade apart and not intended for public distribution, underscore the point.

In a letter dated July 9, 1965, Jon D. Anderson, the general manager of the New York State Atomic and Space Development Authority, authorized the burial of waste with a radioactivity level of "10,000 rems per hour surface dose," at the commercial low-level dump at West Valley, N.Y.

Twelve years later, an internal memorandum from the files of the Nuclear Regulatory Commission, dated Nov. 2, 1977, noted that the operator of the low-level burial ground at Barnwell, S.C., "has handled waste ranging in intensity from 5 to 10,000 rems per hour."

Anyone exposed for about three minutes to a material emitting 10,000 rems per hour would be dead in days, a few weeks at most.

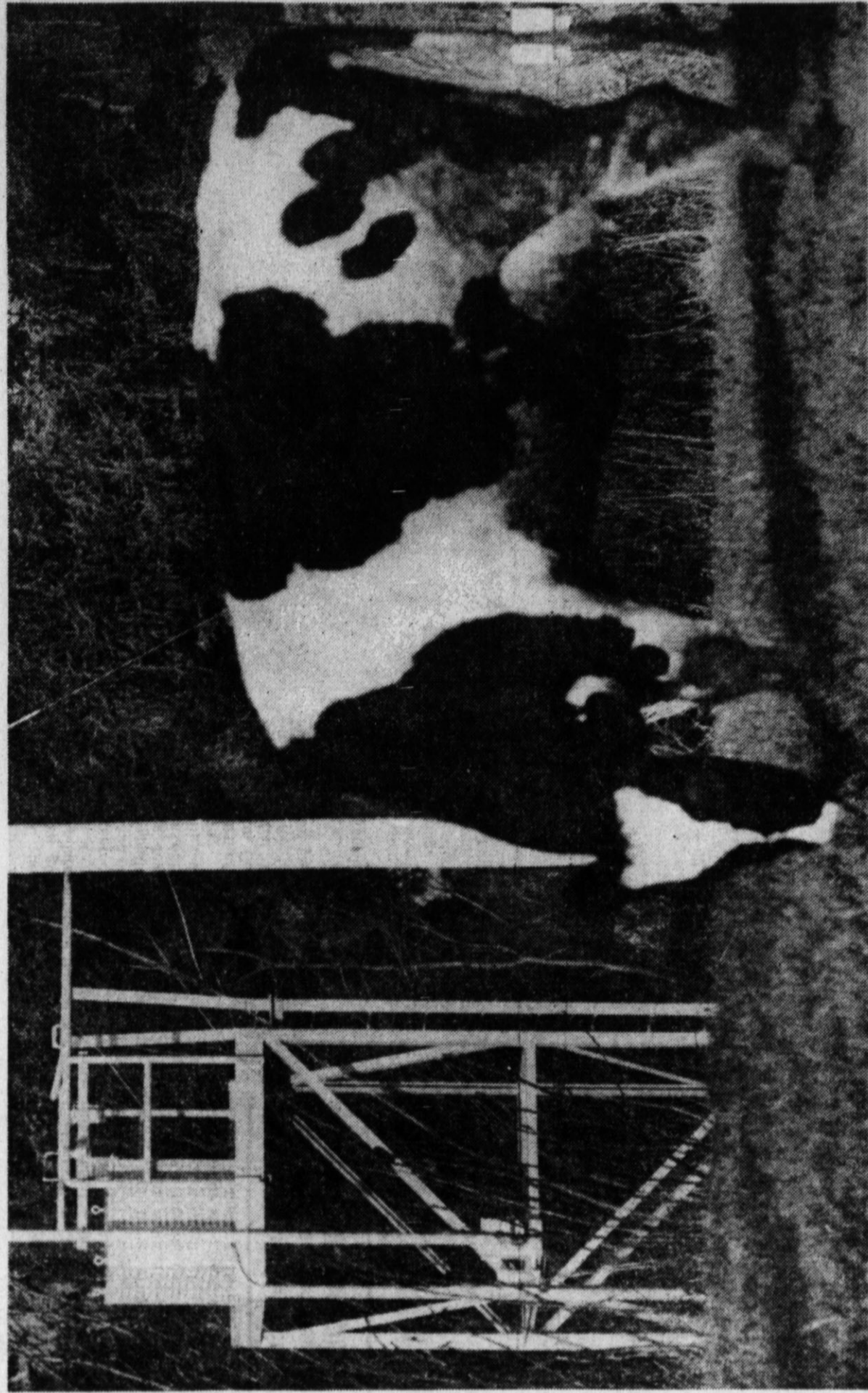
West Valley and Barnwell are not exceptions. Waste with similarly high levels of radioactivity has also been dumped at the nation's other low-level burial grounds.

The failure of both government and industry to speak candidly of the lethal materials that are included in low-level waste has contributed to the confusion, as well as the growing public distrust, surrounding nuclear burial grounds.

So it was that when, at a public hearing prior to the opening of one burial ground, a concerned citizen asked an industry representative whether any special handling would be required for low-level waste, he was assured:

"No, only that it is kept a certain distance from film like X-rays. It will expose film if it is adjacent to these [waste] drums."

PART THREE



A cow grazes near the closed West Valley, N.Y., reprocessing plant; behind it a 'gauging station' measures rainfall and radiation

How the government gambled on reprocessing — and lost

A failure on all fronts

The birth of commercial nuclear power in the United States was based on a single assumption — that used fuel rods from reactors would be recycled into fresh fuel in a reprocessing plant.

It sounded simple enough. The fuel rods, which reactors would discard by the hundreds of thousands each year, would be dissolved in a chemical solution. Then the reusable uranium and plutonium would be recovered and fashioned into more fuel.

The lethal, intensely radioactive liquid waste that remained would be converted into solid form and placed in an underground repository, where it would be isolated from man and the environment for centuries.

Without reprocessing, experts in government and industry agreed, there could be no large-scale nuclear society. Fuel rods could not be allowed to simply pile up at dozens of reactor sites across the country.

"There are some problems in letting any quantity of [fuel rods] accumulate in storage," Edward J. Bloch, director of the Atomic Energy Commission's production division, told Congress' Joint Committee on Atomic Energy in May 1958.

Today, a quarter-century later, fuel rods are doing just that: Piling up.

And the assumption that gave birth to a nuclear power industry with more than \$100 billion invested in plants and equipment turned out to

be wrong — just one more entry in the federal government's encyclopedia of radioactive waste management mistakes.

Reprocessing, once the centerpiece of American nuclear planning, is instead an economic, technological and environmental failure.

Government officials predicted that reprocessing would profitably convert large quantities of nuclear waste into valuable fuel and other byproducts. They were wrong.

Scientists repeatedly assured that all the technological problems of reprocessing had been solved. They were wrong.

Nuclear regulators promised that reprocessing could be accomplished without threatening the environment. They were wrong.

In the end, 30 years of promises, assurances and bright predictions have produced nothing but a growing hoard of radioactive waste and new promises about what will be done with it.

In a way, that was only to be expected. Virtually every major claim made by government officials and scientists about the management of nuclear waste has turned out to be empty talk.

Beck in January 1959, a little more than a year after the first nuclear plant began producing electricity, told a subcommittee of Congress' Joint Committee on Atomic Energy:

"We have estimated that there will be possibly 20 chemical [reprocessing] plants. [They] can be centrally located so that the shipping distances [from reactors] are not greater than 200 to 500 miles."

By 1965, the U.S. Atomic Energy Commission (AEC), charged with promoting the growth of nuclear power, envisioned reprocessing plants literally everywhere.

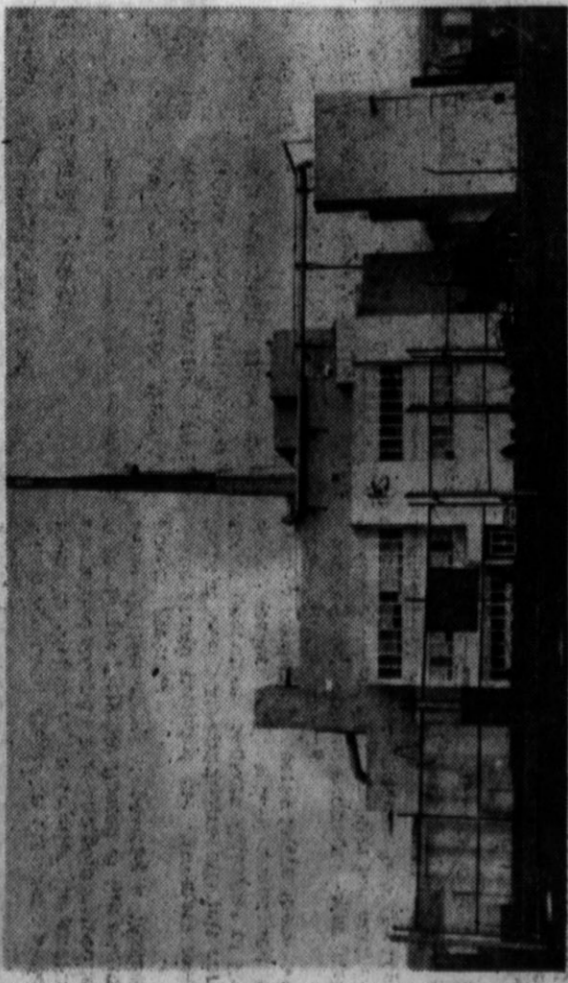
"It is not unreasonable to foresee a day," the AEC reported, "when large nuclear power sites may have their own integrated reprocessing plants."

Despite the AEC's unbridled optimism, its vision of a reprocessing plant connected to every reactor complex failed to materialize. Nor did the more modest 20 reprocessing facilities anticipated by the Oak Ridge National Laboratory.

Only three commercial reprocessing plants were ever built. Two never opened: one at Morris, Ill., because the owners discovered belatedly that it would not work; the other at

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Three plants, three failures



Philadelphia Inquirer / NICK KELSH

West Valley, N.Y.: A radioactive memorial

This is the only commercial reprocessing facility that ever operated in the United States. It opened with great fanfare in 1966 and closed in 1972, leaving behind 572,000 gallons of liquid radioactive waste.



Associated Press

Barnwell, S.C.: Too costly to complete

This reprocessing plant was doomed by economics and changing regulations before it could be completed. Federal officials have tried to interest other countries in investing in it, or at least sending fuel assemblies to it.



Philadelphia Inquirer / NICK KELSH

Morris, Ill.: Stopped before starting

General Electric Co. built this reprocessing plant only to find out during a dry run that the technology did not work. Today, the plant sits idle; some used fuel assemblies are stored there.

Barnwell, S.C., because it was too costly to finish without government help. (Barnwell still handles a large share of the nation's low-level nuclear waste, at a dump site near the unfinished reprocessing plant.)

The third and only operating plant, at West Valley, N.Y., sputtered along for six years before shutting down in 1972, leaving behind 572,000 gallons of highly radioactive liquid and a possible billion-dollar cleanup bill for American taxpayers.

With a touch of understatement, the House Committee on Government Operations later concluded that "all seem to have made an inadequate technological assessment of the waste disposal problem."

When the history of nuclear-waste management is written, July 31, 1963, probably will go down as the official date of death for commercial reprocessing, although many in government and industry have yet to formally recognize its passing.

The end came quietly at Barnwell, S.C., at the plant that never opened, a lasting monument to the chasm that has separated the nuclear rhetoric of government from the economic reality of the marketplace.

It was on July 31 that federal funds ran out for research projects that had kept the Barnwell Nuclear Fuel Plant open in hopes that someone, somewhere, would acquire it for the purpose for which it was built.

That was not to be. After nearly two years of frantic negotiations, would-be buyers — foreign utilities, a consortium of American utilities and major corporations — all dropped out of the bidding.

A U.S. Department of Energy official, seeking to put the best possible light on the last days of an industry that never survived its infancy, told The Inquirer:

"We had had hopes, and in fact the secretary of energy is on record as having said that we stand ready to negotiate with any industry entity which chooses to come forth with a proposal on preserving the plant....

"As of today, we have no such proposal. We're not aware that any specific proposal is in the offing.... I think it's fair to say with each passing day the prospects would appear to be decreasing."

George T. Strubling, vice president of regulatory and public affairs for Allied-General Nuclear Services, the company that owns Barnwell, said the plant started this year with about 300 employees.

"We're down to something well under 150 now," he said, "and all of the people here have been given notice of the dates beyond which their services will not be required, so that we'll be down to probably less than 10 people by year-end.... Barring something unforeseen, we will have a padlock on the door, and all cleaned out, by then."

Supporters of reprocessing may yet find government funds to subsidize Barnwell, although there are fundamental questions about its prospects for safe and effective operation. (It would take anywhere from \$500 million to more than \$1 billion to install equipment still needed, plus additional millions to run the plant.)

But even if the plant could be made to run perfectly, it would make no sense as an economic means of dealing with the used fuel rods stacked up at nuclear power plants in 24 states.

The uranium recovered would be far more costly than that mined from the earth. Plutonium, the other principal byproduct, could be used in nuclear weapons, but only if Congress reversed a longstanding policy of not mixing peaceful and military uses of the atom.

The only other possible use for the plutonium would be as fuel for an as-yet unbuilt breeder reactor. A breeder operates much like existing reactors, except that it runs on the plutonium rather than uranium and is designed to generate more fuel than it uses. Hence the name. But the breeder reactor is another expensive dream of the nuclear establishment that appears to be dying.

Whatever the outlook for government subsidies, the story of commercial reprocessing in the United States is the story of nuclear-waste management — failure piled upon failure.

For that reason, reprocessing's story says much about what may be expected in the years to come from the government's plans to manage the lethal radioactive garbage that is accumulating across the country.

Appropriately enough, the story began and ended on the same two notes: Flawed economics and an imperfect technology.

A reprocessing bargain: What nature offers at \$23 a pound could cost \$400

More than 23 years ago, during a hearing conducted by the Joint Committee on Atomic Energy in February 1960, Rep. Chet Holifield (D., Calif.) offered an explanation for the business community's failure to build reprocessing plants despite the government's urging.

The Atomic Energy Commission "tried to get private industry into... fuel reprocessing for years," Holifield said, but "private industry cannot afford to do it.... It just simply is not economic."

When Rep. Melvin Price (D., Ill.) pressed a representative of the Edison Electric Institute, the electricity trade association, for some further explanation, the official replied:

"I think, as Mr. Holifield points out, the restrictions have been basically economic."

What was true in 1960 is true today, only more so.

James A. Buckham, president of Allied-General Nuclear Services, acknowledged that in a letter earlier this year to Secretary of Energy Donald P. Hodel:

"We share your view that the Barnwell Nuclear Fuel Plant is a vital national asset," Buckham wrote on May 24, "but, as you know, we do not believe that [it] can be completed and operated on a commercial basis."

Allied-General is a joint venture in which a chemical, oil and gas, aerospace and electronics conglomerate, holds a 50 percent interest, and Gulf Oil Corp. and the Royal Dutch/Shell Group each hold a 25 percent interest.

Even given the resources of such large corporations, it is clear that opening a reprocessing facility now would mean financial disaster to the company that tried it.

An Inquirer analysis of the performance of the one plant that did open — in West Valley, N.Y. — indicates, together with other available data, that for reprocessing to be a viable business, uranium derived from it would have to sell for upwards of \$400 a pound.

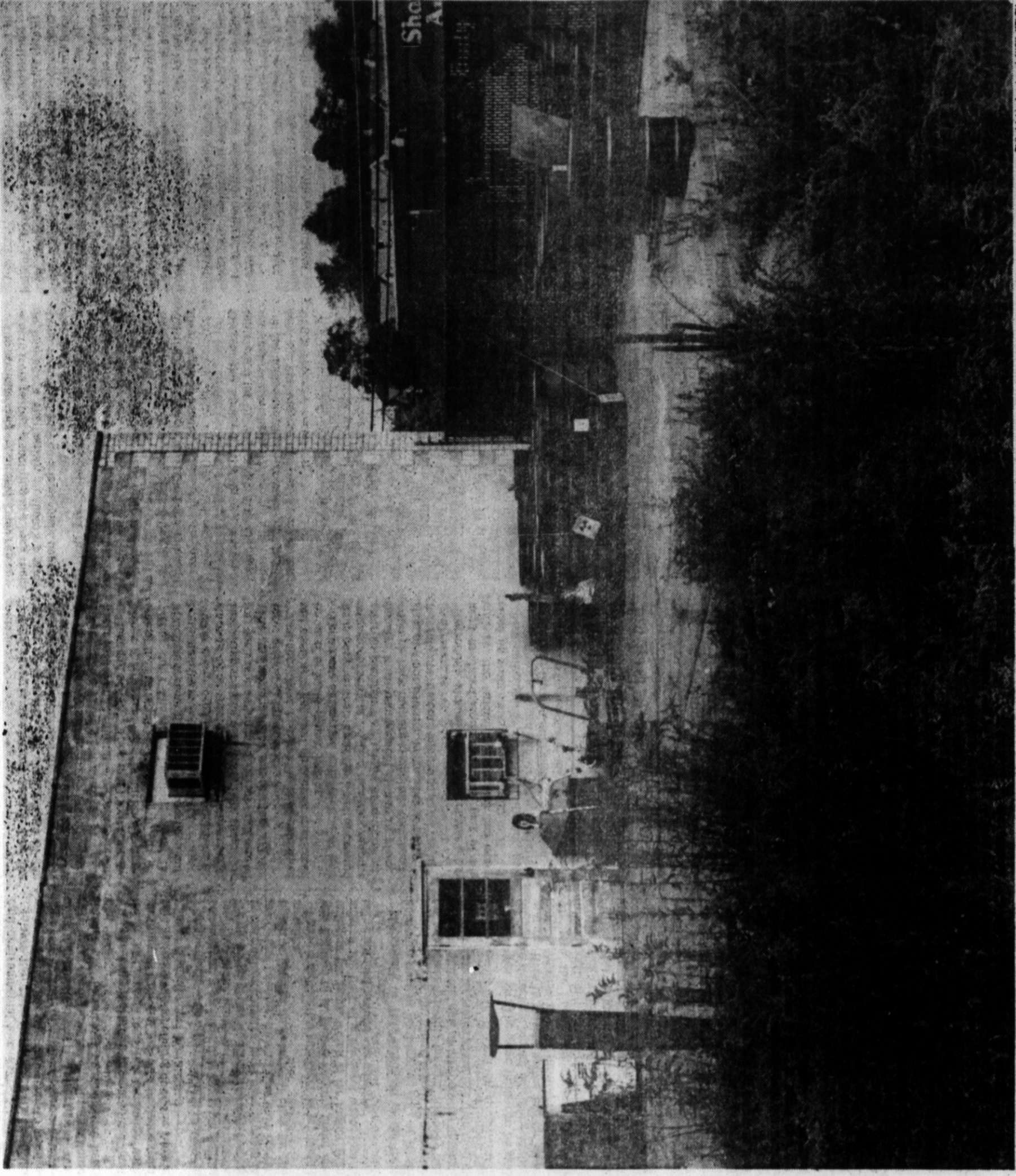
Since uranium mined from the earth sells for \$23 a pound on the spot market — and imports have been curbed to help prop up the price — there would be no buyers for reprocessed uranium.

In that sense, the tons of uranium in used fuel rods are like the tons of gold in sea water. The gold is indeed valuable, but the cost of extracting it far outweighs the value.

That is why electric utilities have displayed no interest in investing in Barnwell as a source of uranium.

A spokesman for Commonwealth Edison Co.

Nuclear Waste in America



Philadelphia Inquirer / NICK KELSH

Applied Health Physics in Bethel Park, Pa., stores waste temporarily; in this October 1982 picture, barrels sit behind ropes with radiation warnings

Because the federal government does not track nuclear waste from production through burial, opportunities abound to illegally dump or store it.

And those opportunities will multiply with the growth in industrial use of radioactive materials and the mounting pressure to curtail shipments to existing burial grounds.

Three years ago, the General Accounting Office (GAO), the investigative arm of Congress, warned of the consequences of the government's failure to effectively monitor waste production.

"Without a method to track waste from the point of generation to the point of disposal," the GAO said, "it is highly probable that illegal

In the summer of 1980, the NRC discovered more than 60 barrels of waste stored in an open area, exposed to rain and snow, at the company's headquarters in an industrial park.

Many of the 55-gallon drums contained radioactive liquids, and were deteriorating, according to NRC reports. Some had been in storage since October 1978, over a year beyond the permissible time limit.

In documents filed with the NRC, Robert G. Gallagher, president of Applied Health Physics, blamed it all on the hospitals that originally sealed the waste in the barrels.

"These drums were illegally packaged and stored in the barrels at Bethel Park," would present an unreasonable hazard to the health and

A year earlier, the company had shipped 56 barrels to the burial ground at Barnwell, S.C. All were labeled as containing solid waste.

When they arrived at the site, Barnwell inspectors checked three of the drums and found that two held radioactive liquids. All 56 drums were returned to Bethel Park because of improper packaging.

Further inquiry, Gallagher said, showed that 16 hospitals where the waste was picked up "had disposed of liquid wastes... and had described these drums as containing solids."

Whatever the case, the Nuclear Regulatory Commission determined that continued storage of the barrels at Bethel Park "would pre-

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plants in 1980 (1.4 million cubic feet), as well as the volume generated by other industries and institutions (1.3 million cubic feet).

The report went on to state that "commercial low-level wastes are disposed of by shallow land burial at one of three commercial sites, which collectively received about 1.75 million cubic feet of low-level wastes in 1979 and 3.2 million cubic feet in 1980."

The report projected annual nuclear-waste production through the end of this century, putting it at 7.9 million cubic feet in the year 2000, up 193 percent from 2.7 million cubic feet in 1980.

To add authenticity to its numbers, the Energy Department noted that its report was "prepared in consultation with the governors of the states, the Nuclear Regulatory Commission, the Environmental Protection Agency, the U.S. Geological Survey, and the U.S. Department of Transportation."

So what's the problem with the government's statistics? Just this: No one really measures how much low-level nuclear waste is produced, or the level of its radioactivity.

The only data the government collects is the volume and radioactivity of waste deposited at commercial and federal burial sites. It then assumes that the volume buried is the volume produced.

That is as if the U.S. Department of Agriculture took the amount of wheat consumed or exported last year, which was 2.4 billion bushels, and announced that this was the amount grown by farmers.

In truth, 2.8 billion bushels of wheat were produced — and 400 million of them are in storage somewhere.

When it comes to wheat and other items, the government gathers statistics both on the volume produced and the volume sold or disposed of. Not so with nuclear waste.

As a result, federal agencies do not know how much radioactive garbage is generated and then stored at unauthorized sites or dumped illegally, rather than shipped to licensed burial grounds.

Some state officials are suspicious of the low-level waste statistics for other reasons. Joseph Ward of the Department of Health Services in California, the state that lost 80,000 curies of waste according to the federal government's records, questions the overall reliability of the numbers.

"The data's been sort of had anyway," he said, adding that "none of it ever seems to agree completely with what it is that's being shipped."

Individual states, which have few resources to track the spread of low-level waste — yet are responsible for it by law — have attempted on occasions, without success, to identify all the waste produced within their borders, something the federal government has long neglected to do.

Milton Zakor, nuclear policy analyst with the Illinois Department of Nuclear Safety, said that Illinois once tried but failed to obtain accurate counts of their waste volume.

"For 1980, we did our own study by contacting people," he said, "but they don't know, really."

"The hospitals and users really don't have a good idea, I'll industrial users, of exactly how much they ship out. It seems strange."

According to the survey results, Massachusetts businesses and institutions generated waste that contained 443,000 curies during the three years. Of that amount, 371,000 curies worth was shipped to commercial burial grounds.

But during the same period, the burial grounds reported receiving only 318,000 curies of waste from Massachusetts — 53,000 fewer and 125,000 fewer than they said they produced.

Even this study was of limited value. It consisted of sending a questionnaire to each known waste producer. No attempt was made to physically verify any of the information.

Despite the obvious flaws in the government's statistics, it is still possible to draw some general conclusions from the numbers, with the understanding that these are based solely on the volume of waste that burial grounds reported receiving.

Bearing that in mind, an Inquirer analysis of the government's data for the last two decades disclosed a curious trend in the 1980s — a first in the history of the atomic era.

In 1981 and 1982, the nation recorded its first back-to-back yearly declines in the volume of low-level waste shipped to burial grounds.

The Inquirer study suggests that as much as 1.4 million cubic feet of radioactive garbage simply disappeared during the two years.

That is waste which, according to historical growth patterns, should have been buried, but was not.

If the Energy Department's projections of the growth in low-level waste production are used, then the waste that vanished in 1981 and 1982 totaled even more — over 2 million cubic feet.

From 1962 to 1980, the volume of low-level waste buried each year rose steadily from 66,000 to 3.26 million cubic feet, according to government records.

Then it dropped 10 percent in 1981 to 2.94 million cubic feet, and fell an additional 9.5 percent in 1982 to 2.66 million cubic feet. The volume buried in 1982 was actually 95,000 cubic feet below that buried four years earlier, in 1978.

During the same years, however, the amount of electricity generated by nuclear plants rose from 276.4 billion to 282.8 billion kilowatt-hours. Power plants account for more than half of all commercial low-level waste buried, government records show.

It is believed that some of the waste reduction is attributable to improved compaction techniques instituted by industry to cut shipping and burial costs.

In addition, a change in federal regulations allowed medical institutions to hold on to some types of radioactive waste until it decayed to a harmless level, and then dump it in ordinary landfills.

But it seems unlikely that the entire decrease of 1.4 million cubic feet — or 2 million, as the case may be — is due to tighter packaging and reduced medical waste.

What's more, preliminary data gathered by the Inquirer indicate that the burial of low-level waste this year — based on figures for the first six months — will fall an additional 2 percent from last year, to a projected 2.61 million cubic feet.

Energy Department officials are unable to explain the continuing dropoff. They refer all questions on the subject to EG&G Idaho.

be compressed. If three cubic feet of waste containing 10 curies are mashed into one cubic foot, there are still 10 curies in the smaller volume.

From 1980 to 1982, the radioactivity level in low-level waste buried at the commercial burial grounds in this country averaged 342,000 curies a year.

That was down 135,000 curies — or 28 percent — from the 477,000 curies in 1979's waste. When the decreases for the three years are totaled, the 1980-82 decline amounts to 405,000 curies.

This falloff came at a time when curie output should have been going up because of growing nuclear power production, additional maintenance on aging reactors and expanding use of radioactive materials by other industries. In fact, the curie output undoubtedly did rise.

The implication is that more than 400,000 curies are unaccounted for, according to the government's own statistics — a glaring contrast with the "lost" fraction of one curie at the bottom of a Pennsylvania bore hole or along a Massachusetts highway.

It is possible that they are in waste dumped illegally. It is also possible — though very unlikely — that they are merely an accounting error, a minor addition to the long list of the government's nuclear mistakes.

Whatever the case, they underscore the failure of both federal and state governments to keep tabs on low-level waste. And the government is not alone. Industry, too, has misplaced its share of radioactive trash.

Hoardings of waste pile up as states restrict the use of dumps

It was only by accident that Texas Health Department officials discovered in 1980 that Todd Shipyards Corp. had 12,000 barrels of nuclear waste in storage.

The 55-gallon drums, many in "deteriorated condition," and some containing deadly plutonium and strontium, according to court records, were stacked up in a warehouse on Pelican Island in hurricane-prone Galveston Bay.

Along with its facilities for building and repairing ships, Todd operated a radioactive-waste collection and processing center on the island.

Electric utilities, medical institutions and other waste generators sent their nuclear garbage to Todd's Research and Technical Division, where it was compacted and shipped to licensed burial grounds.

After Texas authorities began an investigation, Todd discovered an additional 4,800 barrels of radioactive waste on its property, bringing the total for the year to almost 17,000.

A Todd official had an explanation for the newly discovered 4,800 barrels, which he spewed out in legal papers filed in Galveston County District Court.

He said that 2,000 of the barrels were an "administrative accident" and fire at the plant, and 1,300 "were an error in initial counting."

How could such a "counting" error occur? The Todd executive explained that, too, in testimony during legal proceedings initiated by Texas to compel Todd to send its nuclear garbage to some other state.

Assistant attorney general — And it's just that somebody walked around going one, two,

three, four, etc. and they missed it somehow? Todd executive — With a number of that size I would say I would, you know, that size, 1,300, I would say I would have missed some section of drums they thought they counted and didn't, something like that.

Whatever happened at Todd, it is likely that more and more companies will find nuclear garbage piling up in their warehouses soon. That is one likely result of the mounting opposition to radioactive waste in the three states with the only operating dumps — Nevada, South Carolina and Washington.

In 1979, two of the three refused to accept waste for a time to protest their status as nuclear dumping grounds for the rest of the country; the third, South Carolina, limited the amount it would accept. These actions led in part to the buildup of atomic garbage at Todd and similar facilities.

The late Dixy Lee Ray, then governor of Washington, summed up the attitude of the three states during an appearance before a House Science and Technology subcommittee in November 1979.

"We believe there are not enough [burial grounds] in the United States. All the material coming to two or three sites is not really appropriate."

It doesn't make very much sense to be trucking materials that are now being re-cycled in the State of Washington clear from New England, 3,000 miles across the country."

Now, South Carolina has permanently restricted the volume of waste it will accept from other states.

Nevada has imposed tough packaging and shipping regulations that have discouraged waste generators from sending nuclear garbage there.

Both Nevada and South Carolina have announced their intention to get out of the low-level waste burial business, albeit by different timetables.

The disenchantment all three states share with the rest of the country is best expressed in the records of their individual dumps. Nevada is typical.

An Inquirer study based on Energy Department statistics shows that in the years 1979 to 1981, seven states — Nevada not included — accounted for 76 percent of the nuclear garbage buried at the commercial dump at Beatty, Nev., about 100 miles northwest of Las Vegas.

The states and the volume of waste each shipped: California, 230,000 cubic feet; Pennsylvania, 77,000; New Jersey, 70,000; New York, 59,000; Illinois, 59,000; Michigan, 50,000; and Nebraska, 40,000.

As for Nevada's stringent new regulations went into effect in December 1980, the volume of nuclear waste buried at Beatty plunged 88 percent, falling from 450,000 cubic feet that year to 53,000 in 1982.

As for Nevada's attitude toward waste shipments from other states, former Gov. Robert List spoke for many residents when — upon learning that Beatty might receive 700,000 gallons of contaminated water from Pennsylvania's crippled Three Mile Island plant — he told local newspaper reporters:

"If it's liquid, the people responsible for it can drink it."

That Nevada's opposition to nuclear waste is bipartisan — as it is in other states — is reflected in a lawsuit that List, a Republican, initiated to close Beatty permanently. His Democratic successor, Gov. Richard H. Bryan, is pursuing the suit.

At the second nuclear dump, at Barnwell, S.C., the volume of waste buried fell 37 percent from 1980 to 1982, dropping from 1.9 million to 1.2 million cubic feet.

In Chicago, the nation's largest generator of nuclear electricity, told The Inquirer: "If you could get a hundred utilities together, if there were a hundred interested, each utility would have to justify its contribution based on expected return of investment. And the way the math works now, that's just not there."

"Even if I only had to invest \$20, if I'm looking at a zero return and nothing but risk, how can I justify that to my ratepayers? It doesn't matter into how many small pieces you cut it, the point is that the return's got to be there."

Just how bad is the math? At the time that West Valley shut down in 1972, Nuclear Fuel Services Inc., which operated the plant, charged \$23,400 for a metric ton of reprocessed uranium, according to court records. (A metric ton is 2,204.62 pounds.)

Four years later, the company said that to reopen the plant it would have to charge \$1010,300 for a metric ton of uranium — a price increase of 4,218 percent.

The figures may be easier to understand if translated into a more familiar form of energy. In 1973, crude oil produced in the United States sold for an average of \$3.89 a barrel. (A barrel contains 42 gallons.)

If the price had risen at the rate of the quoted price for reprocessed uranium, crude oil today would sell for \$168 a barrel — over five times more than its current price of \$29. And that understates the problem, because the reprocessed-uranium price was set in 1976 before the United States entered an era of double-digit inflation. Adjusted for inflation, the \$1,010,300 charge of seven years ago would be more than \$1,800,000 today.

If crude oil rose equivalently, it would cost \$297 a barrel — and that would mean gasoline selling for \$29 a gallon.

Advocates of reprocessing, of course, use another set of numbers, which suggest that a plant could operate profitably if mined uranium sold for something less than \$50 a pound. They insist, too, that West Valley's performance is not a proper standard, that a newer and larger plant such as Barnwell would operate more efficiently.

But that is what supporters said about West Valley. In documents filed with the Atomic Energy Commission prior to the plant's opening, Nuclear Fuel Services predicted a gross annual profit of \$4.6 million. Instead, the company suffered multimillion-dollar losses.

A commercial reprocessing plant at La Hague, France, charges more than \$300 a barrel contains 42 gallons.)

found for uranium. And that plant is subsidized by the French government.

The West Valley story: Great expectations end in six dismal years

ow could three decades' worth of glowing predictions about nuclear-fuel reprocessing have been so wrong?

Perhaps the place to begin is in a cow pasture in western New York state on a bright, sunny day in June 1963.

With the noontime temperature hovering at 70 degrees, a crowd of nearly 1,000 gathered in a hollow on the edge of West Valley, about 30 miles south of Buffalo, for a historic ground-breaking.

They were there to celebrate the start of construction of the world's first privately owned reprocessing plant, to be built by Nuclear Fuel Services Inc., a company jointly owned by W.R. Grace & Co. and American Machine & Foundry.

In a ceremony staged in the grand style of then-Gov. Nelson A. Rockefeller, the audience assembled around a blue-and-gold striped tent. A miniature dirigible floated at the end of a cable 100 feet above it, bearing a "Welcome guests" greeting.

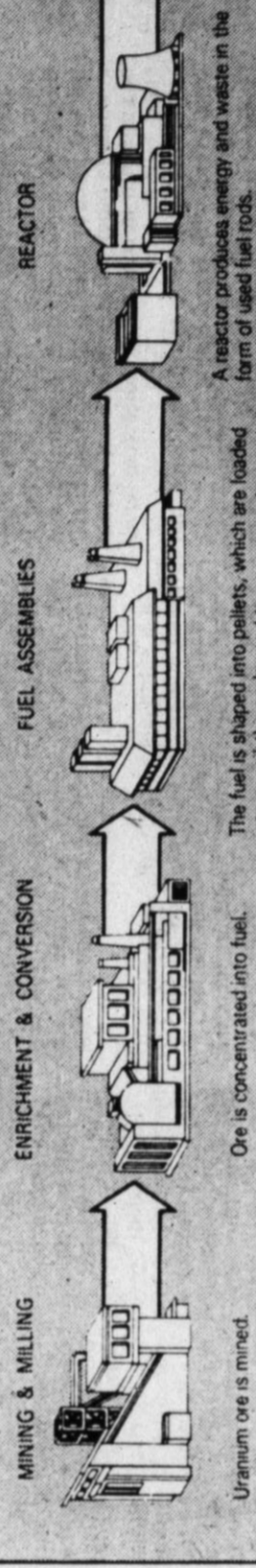
The crowd included the customary assortment of local, state and federal officials, corporation executives, bankers, Chamber of Commerce leaders, high school bands and the curious residents of nearby farms, there to see history in the making.

Three beauty-contest winners — Miss Buffalo, Miss Southern Tier and Miss Southern Erie County — showed in a pageant how the reprocessing plant would work.

A succession of dignitaries spoke with unstinting praise of the industry to be born on the former farm.

J. Peter Grace, president of W.R. Grace & Co., hailed the plant as a project that "in the end may well prove to be the most important industrial advance of the second half of the 20th century."

How the production of nuclear fuel and power works



MINING & MILLING

ENRICHMENT & CONVERSION

FUEL ASSEMBLIES

REACTOR

ON-SITE POOL

The fuel is shaped into pellets, which are loaded into pencil-thin rods used to power reactors.

A reactor produces energy and waste in the form of used fuel rods.

The used fuel rods are stored in water-filled pools at the reactor site. There they will remain until another way to handle them is developed.

Creation of high-level waste products

Within a reactor, uranium nuclei are split by neutrons, creating more neutrons and a chain reaction called nuclear fission. The fission process heats water to create steam, which powers a generator that produces electricity.

Through the fissioning, radioactive by-products are formed in the rods, which absorb the neutrons and slow down the reaction. When they slow it down too much, the rods must be removed, even though they contain over 90 percent of their original uranium.

From one-fifth to one-third of the assemblies are replaced every year, depending on the size and design of the reactor. According to government projections, 492,000 fuel rod assemblies will be in storage by the year 2020.

Radioactivity in used fuel rods gradually decreases, but at varying rates. Here is the rate of decay of some materials in a metric ton of used fuel rods after being removed from a reactor core. There are about 10,000 metric tons of used fuel rods in storage. In the year 2000 there will be 58,000 tons.

Table with 3 columns: Material, Date, and Curies. Rows include Cesium 137, Strontium 90, and Plutonium 239 at different dates from 1984 to 2014.

Why efforts to deal with waste have failed

Used fuel rods were to be reprocessed for new fuel for use in conventional reactors and plutonium for breeder reactors, with solidified waste going to high-level storage sites.

REPROCESSING STEP: Reprocessing has never been attempted. PROBLEM: All U.S. reprocessing efforts have failed for economic or technical reasons. Commercial solidification has never been attempted.

RECOVERABLE URANIUM STEP: Recovered uranium would be refashioned into fresh fuel for conventional reactors. PROBLEM: The prospective cost of such fuel is uneconomically high compared to newly mined fuel.

PLUTONIUM STEP: Plutonium to breeder reactor. PROBLEM: The breeder program is stalled for economic and technical reasons.

HIGH-LEVEL WASTE STORAGE STEP: Waste to high-level storage. PROBLEM: Technical and political problems have virtually blocked efforts to build a high-level depository.

BREEDER REACTOR

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Rodney C. Gout, president of American Machine & Foundry, said the plant would provide a prototype for similar centers all over the world.

A beaming and enthusiastic Gov. Rockefeller, who was campaigning for the 1964 Republican presidential nomination, was equally optimistic.

They went there to ponder how to solidify \$72,000 gallons of shimmering, high-level radioactive liquid waste, stored deep underground in two steel tanks that in time would deteriorate.

They went there to puzzle over why water had collected in 750-foot-long trenches, where 2.3 million cubic feet of so-called low-level radioactive waste — some of it lethal — had been buried with scientists' assurance that water would never collect there.

They went there to assess the options in dealing with 42 radioactive fuel rods that had been buried in the ground because they were ruptured and could not be reprocessed.

They went there to study how to scrape out the sludge that had settled on the bottom of one of the tanks, sludge with a highly concentrated radioactivity measured in the millions of curies.

They went there to study how to scrape out the sludge that had settled on the bottom of one of the tanks, sludge with a highly concentrated radioactivity measured in the millions of curies.

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It has been more than 11 years since Nuclear Fuel Services — which W. R. Grace and American Machine & Foundry sold to Getty Oil Co. in 1969 — shut down the West Valley reprocessing plant.

Oil subsidiary walked away from the plant — as it was entitled to do under its agreement with New York State — leaving to the state and federal governments the responsibility for cleaning up the mistakes of reprocessing.

Today, West Valley is a stark reminder that scientific opinions have an uncanny way of turning out wrong.

Consider, for a moment, what happened to a fund set up in 1963 to provide "perpetual care" for the West Valley site, guaranteeing that the public would be protected forever from the nuclear waste buried there.

At payments to the state Atomic Research and Development Authority, owner of the site. In a report issued in 1964, the New York agency said the fund "by 1980 is estimated to be \$4 million to \$7.5 million, depending upon the volume and type of wastes accepted for storage."

The fund would be "sufficient, utilizing current proven technology, to provide for the perpetual surveillance and maintenance of the waste stored at the center."

In a subsequent report, the authority took special note of the high-level radioactive liquid waste then going into storage tanks.

The Barnwell plant has won the backing of President Reagan

It was against this background that President Reagan, soon after he moved into the White House, mounted a campaign to bring about the long-delayed opening of the Barnwell reprocessing plant.

Within months, he lifted a ban on commercial reprocessing that President Jimmy Carter had imposed in April 1977 to symbolize this country's commitment to halting the spread of nuclear weapons.

Carter had made formal an indefinite deferral of reprocessing that President Gerald R. Ford had initiated a year earlier. Ford took action as a result of studies growing out of India's explosion of an atomic bomb in 1974.

The Indian bomb was manufactured with plutonium from power-plant fuel rods that were reprocessed, in part, with technology supplied by the United States.

The incident drove home, for the first time, the threat posed by reprocessing. It showed that every reactor was a potential bomb factory.

For example, in 1970 the government decided that private reprocessors must convert the liquid waste they generated to solid form for storage.

Later still, federal officials announced that the plutonium extracted from fuel rods also should be solidified. That regulation was a factor in causing the owners of the reprocessing plant in Barnwell, S.C., to halt construction.

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"It doesn't sound too logical," he said. "I don't have any way to explain that. I don't know what the technicalities of it would be. It sounds a little strange."

Arz suggested that California authorities or someone at EG&G Idaho Inc., the Idaho Falls company that collects low-level waste statistics for the federal government, might be better able to explain the soaring volume/plunging radioactivity phenomenon.

Edward Jenrich, an EG&G Idaho official involved in compiling the statistics, was also perplexed by the vanishing curies.

Ward was equally bewildered. After the relevant figures were called to his attention, he had this exchange with a reporter:

Reporter: "Oh, I don't have an answer for that. Golly, have you called EG&G in Idaho?" Ward: "I'm sorry. I'm of no help to you. I'm afraid... That 83,000 to 3,000 idvopi sounded don't tracking the stuff that closely, and so I wasn't know what caused that. But my curiosity is certainly piqued."

That no one could explain the 80,000-curie deficit — that no one had even detected it — may be attributed in large measure to the casual attitude of federal and state government toward low-level radioactive waste, which, its label notwithstanding, can be lethal.

It may well be that in time something will turn up to explain the missing California curies. Perhaps there is radioactive waste material actually missing. Perhaps the curies disappeared in a nuclear accident or a computer — a nuclear accounting error — rather than in the environment.

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But that's all right, too, because no one has missed those curies either.

No one knows whether they have been lost through miscounting or whether they have been lost because radioactive waste is not being shipped to licensed dumps, where the volume is counted.

And no one knows whether the lost curies are curies of iodine or cesium or strontium or plutonium or any other of the mostly man-made radioactive substances.

It would make a difference. Consider what two of these materials would do to someone who happened into their presence — keeping in mind that these effects do not take into account what would happen if the same materials were consumed in food or water.

If, say, 10,000 of the 400,000 or so missing curies happened to be radioactive iodine 130, and you came upon that iodine, you would receive a lethal dose of radiation in three minutes. And you would never notice the material either, for 10,000 curies of radioactive iodine would be about 1/5,500 of one ounce.

If the 10,000 curies were, say, cesium 137, you would receive a lethal dose of radiation in nine minutes. The cesium would be more visible, weighing a little over four ounces.

Hours it takes a short half-life; every 12 hours it has its radioactivity. So if you came across it 40 days after it was produced, and the decay process magically stopped at that moment (which it would not), you would have to stay around for over a century to receive a fatal dose of radiation.

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The inability of federal and state governments to accurately audit large volumes of radioactive waste stands in sharp contrast to the way they respond when tiny amounts of usable radioactive substances — not waste — go astray.

The same government agencies that never notice the disappearance of thousands of curies of nuclear garbage have launched hundreds of investigations over the years to find a couple of curies, even thousands of one curie, of nuclear materials that haven't yet become waste.

They also have routinely imposed fines or other sanctions against businesses and institutions that have mishandled or lost radioactive substances used in medical testing and industrial processes.

A random geographic sampling from the files of the Nuclear Regulatory Commission (NRC) and state regulatory agencies tells the story.

PENNSYLVANIA. When a drilling company lost 1/40 of one curie of a radioactive material at the bottom of a 120-foot-deep hole in a coal seam at Acosta in Somerset County, the well was cemented over, a plaque describing the radiation hazard was posted at the site and the information was added to maps and deeds to comply with NRC guidelines.

NEW YORK. Authorities conducted an investigation and subsequently compelled a university medical center to revise its procedures after 1/60 of one curie was vented into the atmosphere over a seven-day period.

FLORIDA. Police were notified and the news media alerted when a measuring gauge containing 1/7 of one curie was stolen from a construction site.

Nuclear Waste in America

ure that closed in 1972.) An internal Nuclear Regulatory Commission report, dated Dec. 11, 1979, and originally classified "confidential," offers a grim assessment of uranium bookkeeping at Erwin.

During a four-year period, the report stated, the Tennessee facility "has failed to establish a heavily enriched uranium accounting system which can consistently and confidently demonstrate accountability for this sensitive material within acceptable limits of measurement error."

This is not to say that government investigators and company officials are unable to explain any of the uranium disappearances. They do know where some of it went.

Because of an equipment failure, according to NRC records, an undetermined number of pounds went up the plant's smoke stack. Radioactive particles rained over the surrounding area.

In addition, a random survey discovered that the 55-gallon barrels of radioactive waste the company shipped to burial grounds contained 20 percent more uranium than Nuclear Fuel Services had said.

On still other occasions, the company shipped out barrels it labeled as empty when in fact they contained uranium, according to NRC records.

Accounting procedures were so haphazard that, following a joint FBI-Nuclear Regulatory Commission investigation in 1979, an NRC staff member concluded in a report:

How the government counts low-level waste: Backward

f the federal government has lost track of hundreds of pounds of uranium and plutonium, it should come as little surprise that it also has lost tens of thousands of curies of low-level nuclear waste.

In the latter case, all it has to rely on is its own statistics.

The government can say with a fair degree of accuracy how many barrels of beer are produced in the United States in a year (194 million last year), how many cigarettes are manufactured (711 billion), how many cases of apples are canned (1.6 million), or how many pounds of peanuts are harvested (3.4 billion).

But the government is unable to say with comparable accuracy how much low-level radioactive waste is produced.

This does not preclude it, though, from announcing waste statistics. The government does so routinely. And with the same air of authority that it employs in announcing peanut production.

In the fall of 1981, the Energy Department released a seemingly comprehensive, 58-page report that showed the volume of low-level radioactive waste generated by nuclear power

PART SIX

A nuclear mystery: The strange case of the missing curies

From 1979 to 1981, the volume of low-level radioactive waste generated in California rose 40 percent, from 153,000 to 214,000 cubic feet.

Yet the radioactivity in that waste plummeted 96 percent during those same years, from 83,000 to 3,000 curies, according to federal records analyzed by The Inquirer.

How is it possible for the volume of nuclear waste to rise dramatically while its radioactivity falls even more dramatically?

In three words, it is not. But that's all right. No one missed the curies in the first place.

"It doesn't sound too logical. I don't have any way to explain that."

— Leonard J. Arzt, spokesman for the U.S. Department of Energy, when asked how 80,000 curies apparently disappeared from California's low-level radioactive waste

"We don't have an answer."

— Edward Jennrich, official of EG&G Idaho Inc., which keeps statistics on such waste for the government, to the same question

"Oh, I don't have an answer for that. Golly, have you called EG&G in Idaho?"

— Joseph O. Ward, chief of the radiological health branch of the California Department of Health Services

In theory, radioactive waste is the most closely monitored of all hazardous substances. Because even minute quantities can cause disease and death, its handling is tightly governed by restrictive federal and state regulations that run into millions of words.

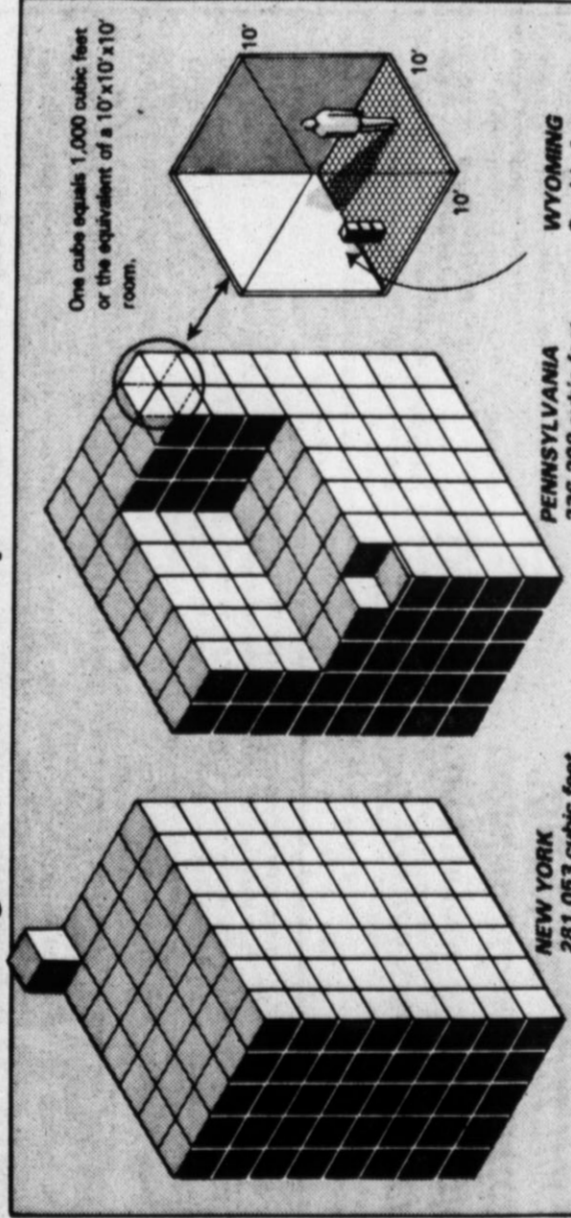
In practice, regulatory responsibility is split among so many different federal and state agencies that enforcement is fragmented and inconsistent, when there is any at all.

No one knows how much low-level waste there is, where it is or how radioactive it is. Nuclear-waste accounting procedures are so primitive that the government's own statistics defy explanation.

Listen to what the regulators and the statisticians had to say about California's disappearing radioactivity.

Leonard J. Arzt, a spokesman for the U.S. Department of Energy, was puzzled by the contradictory numbers when they were pointed out to him.

Average low-level waste produced 1979-1981



By production in cubic feet—annual average 1979-81

New York	281,053	Wisconsin	16,468
South Carolina	267,139	Vermont	15,985
Illinois	264,773	Maine	15,244
Pennsylvania	236,298	Missouri	8,675
Massachusetts	232,072	Kentucky	7,369
North Carolina	226,233	Utah	5,297
California	194,468	Colorado	5,015
New Jersey	148,531	Hawaii	4,226
Virginia	134,205	Oklahoma	3,155
Connecticut	121,504	Mississippi	2,354
Alabama	112,452	New Mexico	2,166
Michigan	87,119	Indiana	1,542
Florida	81,823	Arizona	1,446
Tennessee	80,128	Delaware	1,436
Texas	60,634	District of Columbia	1,212
Minnesota	59,116	New Hampshire	1,212
Georgia	56,432	Kansas	871
Maryland	43,319	West Virginia	486
Ohio	42,012	Louisiana	250
Oregon	41,612	Montana	235
Iowa	28,569	Idaho	97
Nebraska	28,110	North Dakota	71
Rhode Island	26,238	Alaska	6
Washington	25,568	South Dakota	6
Arkansas	24,50	Wyoming	6
Nevada	16,692	Total	3,015,455

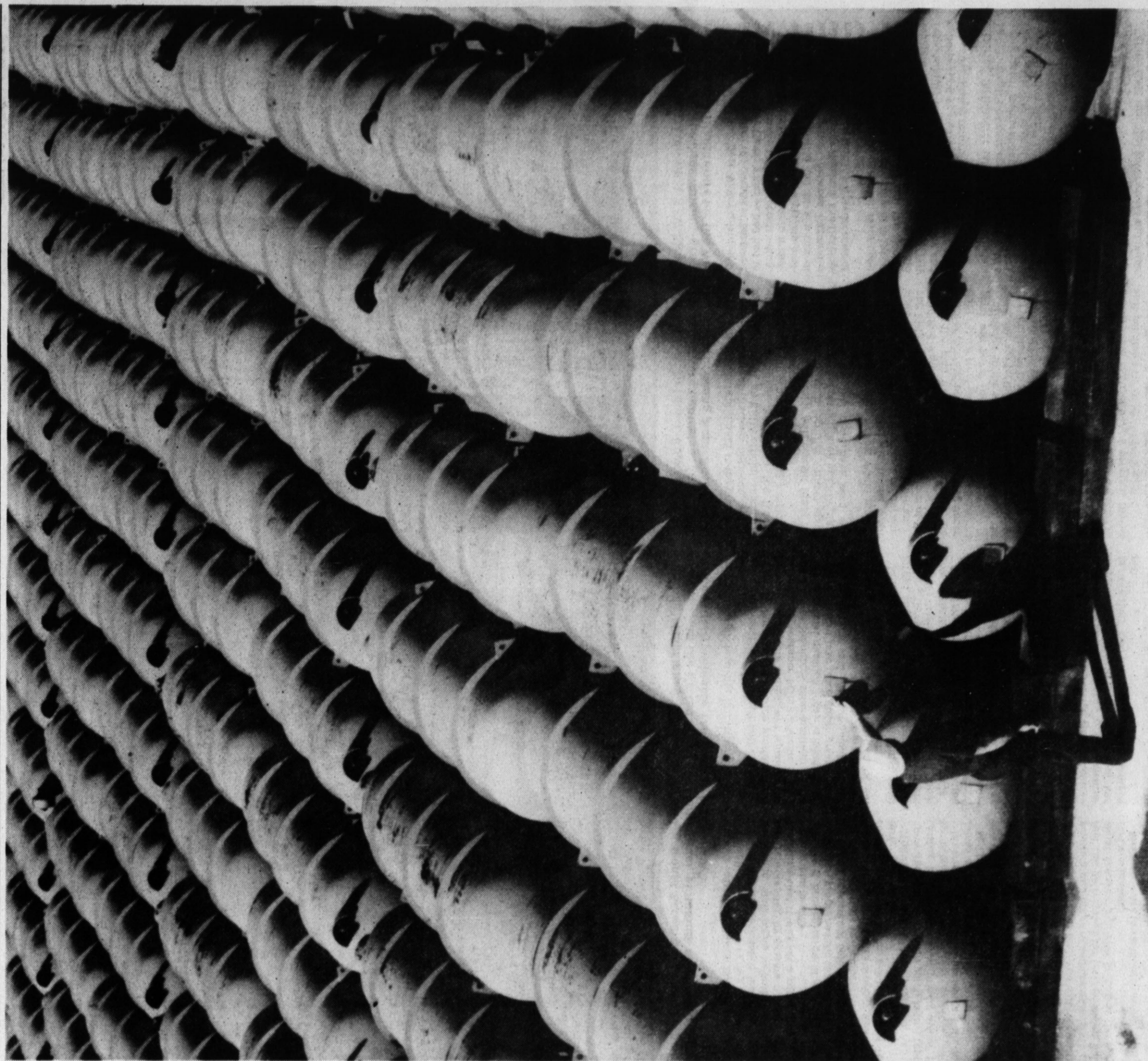
By radiation in curies—annual average 1979-81

Massachusetts	106,097	Indiana	817
New York	71,415	Texas	713
California	39,518	Missouri	319
Florida	31,278	Washington	235
Illinois	18,340	District of Columbia	153
Michigan	14,565	Arizona	109
Pennsylvania	13,971	Oklahoma	89
Alabama	7,744	Tennessee	89
South Carolina	7,676	Mississippi	70
North Carolina	6,738	West Virginia	14
Maryland	6,582	Colorado	13
Minnesota	5,048	Montana	12
Virginia	4,779	Hawaii	11
New Jersey	4,385	New Mexico	5
Connecticut	2,878	Utah	5
Iowa	2,673	Idaho	3
Wisconsin	2,610	New Hampshire	3
Maine	2,520	Kansas	2
Georgia	2,157	Louisiana	2
Ohio	1,967	Rhode Island	1
Arkansas	1,877	Alaska	1
Kentucky	1,821	North Dakota	1
Nevada	1,082	South Dakota	1
Oregon	1,080	Delaware	0
Vermont	995	Wyoming	0
Nebraska	870	Total	363,334

SOURCE: Inquirer analysis of Department of Energy statistics

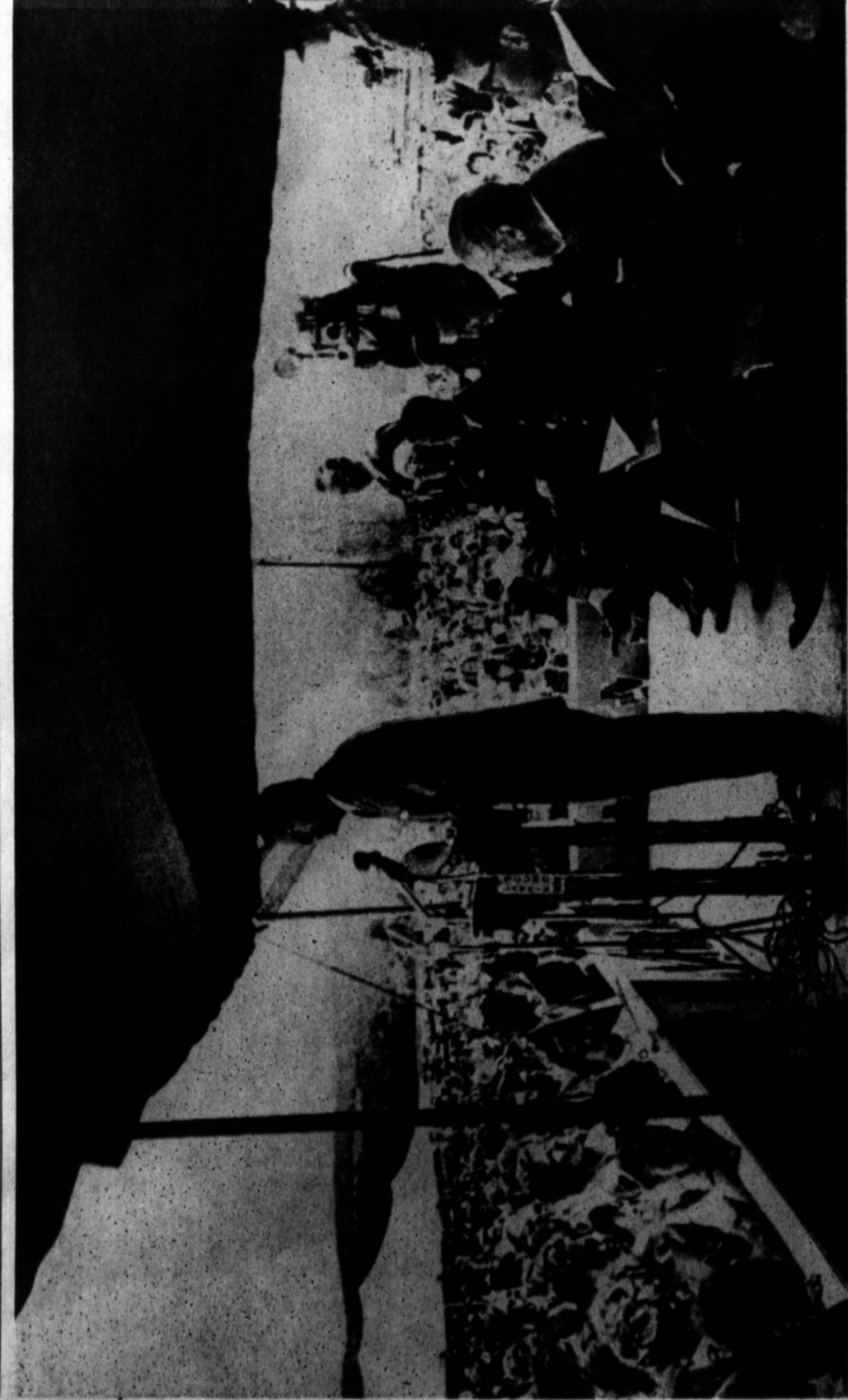
Philadelphia Inquirer/CHARLES CHAMBERLIN

Nuclear Waste in America



CYLINDERS OF URANIUM 238, which would be combined with plutonium in a breeder reactor to produce electricity and more plutonium, are stockpiled in a storage yard at Oak Ridge, Tenn. The government has more than 20,000 such cylinders at various sites, though, hopes for the breeder appear to be dying.

FOREVERMORE.



HAILING THE DAWN OF A NEW ERA, New York Gov. Nelson A. Rockefeller (at microphone), speaking during ground-breaking ceremonies in June 1963, predicted a brilliant future for the West Valley reprocessing plant. Rockefeller, an essential prerequisite to further development...

Not only had the West Valley plant lost millions of dollars, but the owners of Barnwell... two years before Carter's ban... seek federal assistance to finish construction... The negotiations for federal funds to underwrite what had started out as a private business venture were spelt out in a series of memoranda and letters between Barnwell's owners and the Energy Research and Development Administration (ERDA), a predecessor of the Department of Energy...

Nuclear Waste in America

How the act made it through Congress: Lots of self-interest and little thought

The Low-Level Radioactive Waste Policy Act of 1980 — which could lead to the indiscriminate opening of nuclear garbage dumps across the United States — was rushed through Congress with little debate and not much more thought. The legislation was sought by only three states — South Carolina, Nevada and Washington, which had operating commercial burial grounds — and was drafted without much advice from the other 47 states...

ivities within its boundaries. The appeal to states rights was irresistible to many governors, especially those in the South and West, and support grew for the concept of turning the waste over to the states. In response, the Carter administration, which once had been committed to increasing federal control of low-level waste, suddenly had a change of heart. As Dr. Joseph Hendrie, chairman of the Nuclear Regulatory Commission, told members of the House Science and Technology Committee on Nov. 7, 1979...

Early in 1978, an Energy Department task force also called for a more vigorous federal role in regulating commercial low-level waste. That task force recommended that the department take over the nation's six commercial burial grounds. The group saw that as a logical extension of the department's existing low-level waste programs. For decades, the Energy Department and its predecessor, the Atomic Energy Commission, had buried low-level waste generated by the nation's defense program at federal installations. Indeed, at two of those sites, commercial waste too had been buried for a short while in the early 1960s...

But that might not have been the principal motive of the three governors who were pushing it. What they wanted was relief of a political problem they had over radioactive waste in their states, and this bill allowed politicians in all three states to claim political victories. Now it appears that some states, especially those in the populous Northeast, might not have realized the full magnitude of the problems that the 1980 act was destined to create, and might view the issue differently if it were up for a vote today.

"This was sold under the banner of states' rights," said Ron Kucera, deputy director of the Missouri Department of Natural Resources, who followed the bill's progress in Congress. "But that might not have been the principal motive of the three governors who were pushing it. What they wanted was relief of a political problem they had over radioactive waste in their states, and this bill allowed politicians in all three states to claim political victories."

ERDA staff members looked with favor upon a plan that called for the government to invest up to a quarter-billion dollars in the plant. Under the plan, the agency was to build separate facilities at Barnwell and take full responsibility for two tasks: the handling and solidification of liquid radioactive waste, and the conversion of recovered plutonium to solid form. During their secret talks, federal officials and Barnwell's owners agreed, according to a government memorandum dated May 8, 1975, that the facility should be designated as a "demonstration plant" and thereby be "exempted from licensing and regulatory requirements..."

ERDA is providing encouragement to preserve the nuclear option in the future national energy picture. At the same time that government and industry generally were saying in public that reprocessing and waste solidification were proven technologies — claims they had made for years — they were maintaining in private that the technologies had yet to be demonstrated.

FOREVERMORE

receive .35 to .45 inches of rain a year. The water table at Beauty is 300 feet below the surface. The water table is 32 feet below the ground at Maxey Flats, Ky., 10 feet below the surface at Sheffield, Ill., and 8 feet underground at West Valley, N.Y. — sites of commercial dumps that were shut down after water flowed into trenches and carried off radioactive contaminants.

At least one industry official, James L. Harvey, president of SouthWest Nuclear Co., one of the nation's largest handlers of low-level waste, believes that shallow land burial of radioactive material is not appropriate in the Eastern half of the nation.

"I personally feel the type of site that exists now (shallow land burial) is not a feasible option in the East anymore," Harvey said in an interview. "It just doesn't work. There is no way to keep the water out."

"If you don't have a vehicle for migration (radioactive seepage), you've got no problem with the stuff. But water is a vehicle for migration, and once you get on the eastern half of the United States you've got lots of water everywhere."

In addition to technical problems, population densities in the Northeast states will make the task of establishing a low-level burial site even more difficult.

In New Jersey, an average of 979 people live in every square mile. In Montana, by contrast, the figure is 5.5 people per square mile. Massachusetts, it's 733, versus 10 in New Mexico. In Connecticut, it's 639, compared with 7 in Nevada. In Pennsylvania it's 264, compared with 24 in Arizona.

Two likely outcomes: Compacts are rejected, or else they don't work

No one knows, of course, how things will turn out in the Northeast or in any other region. Two possibilities stand out:

One. Even if compact agreements are negotiated for the entire country, states in some areas, notably the Northeast, might balk at approving them.

So far, legislators in New Jersey, Connecticut, Maryland and Delaware have voted to join the compact. But the region's three largest producers — New York, Pennsylvania and Massachusetts — which account for 67 percent of the region's low-level waste, have not shown any inclination to approve it.

Robert Kurrier, the New York state legislative official, said that the agreement, which now avoids any mention of a burial site, would be difficult to pass in New York.

"I know what's going to happen if I were to take this bill to conference. Everybody is going to say, 'OK, where is the site going to be? And if I say, 'I don't know,' I'm liable to get lynched."

Two. A compact might be approved by both the states and Congress, but then unravel when the states fail to agree on the location for a radioactive dump.

That could lead to a dissolution of the compact and perhaps a proliferation of sites within the region — something which past federal studies have said should be avoided and which industry officials say would be prohibitively expensive.

In either case, it now seems certain that Congress, which thought it was signaling off on this issue back in 1980, will have to take another look at it in the years ahead.

That Congress has no desire to do so is evident in its response to the proposed Northwest Interstate Compact on Low-Level Waste Management. "The negotiators dealt with it by pointing and saying, 'We can't deal with this. We'll let the commission that is appointed at the end of the process decide on how to deal with it after everybody joins.'"

As of now, most of the Northeast is waiting in drafting the proposed Northeast

was introduced in Congress in the fall of 1981. In the two years since, Congress has not taken a step to consider the bill. Nor has it looked at similar legislation that was later introduced to approve the Central States and Southeastern compacts.

"We're urging Congress to take quick action on these compacts when they come in," said David Stevens, the aide to the governor of Washington state. "If you want a system in place, one of the ways would be to ratify the first compact. That's a clear signal to the other areas that they're going to have to do something."

Congress has given no such signal. In fact, it is showing every sign that it intends to wait until most, if not all, of the proposed compacts have been negotiated before acting on any of them.

Stevens explains why. "I just don't see any congressman voting for a compact that would shut off a burial site for his state. I just don't see him voluntarily voting on such a measure. Then he's really created a political problem for himself."

What Stevens is saying is that legislators from New York or Pennsylvania, states that are not going to approve the Southeast compact, which would shut off waste from the Northeast, until their region has its own burial ground.

Thus, if one region is unable to reach an agreement, it could hold up approval of all the compacts. For now, the only certainty is that the 1986 deadline for regional burial sites to be in operation will not be met.

In the meantime, two of the three states with dumps are taking steps to cut down on the volume of low-level waste they are burying, a move that is beginning to anger officials in other states.

Ron Kucera, the deputy director of Missouri's Department of Natural Resources, said that when Nevada, Washington and South Carolina sought support for the 1980 act from other states, they promised to keep the three existing sites open to other states while those other states tried to set up burial grounds of their own.

"Instead, access is being frustrated and reduced long before we get to the 1986 date," he said, referring to restrictions imposed by both Nevada and South Carolina. "We don't think that's good faith. Our state is trying to make this work, and we're moving as fast as we can."

"I don't think this is what Congress contemplated when it passed the law, and it certainly wasn't what the rest of the states thought would happen, and if this is what is going to happen, maybe we just ought to look at federalizing the whole system."

Despite all the divisions of opinion, the negotiators of the proposed Northeast compact did agree on one important point.

The compact agreement makes no mention of a specific site or state for burying the Northeast's nuclear waste.

The lack of specifics was no oversight; the compact negotiators intentionally avoided the subject. It was put off because every state knows that a traumatic issue setting up a burial ground in the Northeast would be.

"It's bed enough sitting one of these things when the state says yes," said Joanne Buehler, the spokesman for US Ecology, operator of the Beauty and Richland nuclear dumps.

In the Northeast, with its high rainfall, population density and concern over radioactive contamination, no state is ever going to eagerly face the enormous political problem that would be caused by trying to set up a radioactive dump within its borders.

"Sitting is the worst battle in government today," said one observer of the Northeast. "The negotiators dealt with it by pointing and saying, 'We can't deal with this. We'll let the commission that is appointed at the end of the process decide on how to deal with it after everybody joins.'"

for one state to offer to build the first burial ground. Only if a state steps forward, many observers believe, will the Northeast compact have a chance of succeeding.

At present, most of the states are looking to New York or Pennsylvania to volunteer.

New York, of course, believes that the other state is centrally located within the region. It was the largest generator of low-level waste among the 11 states from 1979 to 1981.

And perhaps most significant, New York already has a commercial burial ground, albeit a failed one, at West Valley. That dump, about 30 miles south of Buffalo, originally was closed after radioactive material was found leaking from the site.

As a new seller to New York state legislators published by the Legislative Commission on Science and Technology recently warned: "No state has a current regional facility. New York State is the only state which has operated a facility in terms of time to get into operation. New York is clearly ahead of the other states, none of which has even surveyed potential sites."

If New York joins the compact and is designated as the original host state, there will be no reason for any other compact member to identify potential future sites. New York could find itself in the position of being redesignated as a two-thirds vote of the commission since it has a regional facility and no other state does.

There is no protection against this eventuality in the proposed compact.

New York's anxiety that it might be designated the nuclear graveyard for the Northeast because of West Valley is not without foundation.

A June 1980 report by the General Accounting Office, an arm of Congress, said that the state could "provide a vital service to its region and itself by agreeing to make the West Valley low-level waste burial ground available for use."

Such suggestions from the federal government contain a hint of tit-for-tat. The burial ground at West Valley was established in the 1960s next to a commercial reprocessing plant that closed after six years of operation, leaving New York State with a potential cleanup bill so large that it had to go to Congress for help.

In 1980, when Congress approved funds for the cleanup, Rep. John Dingell (D., Mich.) suggested:

"There is presently a critical shortage of low-level waste disposal sites, and the lack of such a facility in the Northeast, which is the largest generator of such waste, cannot be ignored. The enactment of this legislation should, therefore, provide a substantial incentive to the State of New York to consider the potential use of this site for meeting regional needs."

As part of the state-federal agreement, low-level waste from the cleanup project is now being buried at West Valley — another factor in New York's fears.

What might have been Philadelphia suburbs once looked like sites

Pennsylvania, too, fears that other Northeastern states would designate it as the regional burial ground if it joined the Northeast compact.

The state is the Northeast's second-largest generator of low-level waste by volume, but is expected to be the region's largest producer in the years ahead as three additional nuclear plants start up this year and in 1984 and 1985.

compact, state officials are not enthusiastic about it.

Instead, they say they are exploring other options. These include a two-state compact with New York in which each state would take care of its own waste, a compact with neighboring West Virginia, which produces a negligible volume of low-level waste, or possibly going it alone.

While much remains to be decided, state officials say that Pennsylvania has no plans to volunteer as the dump state for the Northeast. "Everybody is hoping somebody will volunteer, and we are, too," said Thomas M. Gerusky, director of the state's Bureau of Radiation Protection. "I don't know how the decision to pick the state will be made. The methodology for choosing the state probably won't be decided for about a year."

Pennsylvania State University studied the Northeast under an Energy Department contract to develop guidelines on how a site should be selected, but the report, made public in August, did not make specific recommendations for a burial location.

If Pennsylvania were required to have the site, Gerusky said, "almost any county in Pennsylvania could accept the waste" under current Nuclear Regulatory Commission regulations. As a practical matter, though, he said, "you sure couldn't put it in Philadelphia or Allegheny or a county that has a very high population density."

"You don't need much land," Gerusky said. "But you'd have to have it by a major highway. There are going to be trucks coming in and out of the site. There aren't that many areas one could look at away from major routes."

No work is under way to select a site, state officials say. However, an earlier Penn State study, published in 1968, identified "three potentially favorable" locations in Pennsylvania for burying radioactive waste.

Entitled "Suitability of Pennsylvania Regions for Nuclear Fuel Reprocessing and Radioactive Waste Disposal," the report was prepared by the university's Department of Geology and Geophysics for the state Department of Commerce.

The 150-page document said the three "suitable" areas were:

• Northwestern Pennsylvania, in Erie and Crawford counties, where a stratum of rock known as the Hiram Till consists of clay-rich hills offering a "desirable combination of conditions" for waste burial.

• Northeastern Pennsylvania, in the Bradford County region, where a stretch of land from Towanda to Athens, along the northern branch of the Susquehanna River, is "favorable for dispersing radioactive leachates in the subsurface."

• Southeastern Pennsylvania, where a path extending from "Gettysburg, Wellsboro and York Haven eastward to the Quakertown-Norristown-Doyelstown region" is "a potentially favorable region for radioactive waste storage and disposal."

That the study found geologic structures "suitable for waste storage and disposal" in Montgomery and Bucks Counties — even though it is one of the most heavily populated areas of the nation's fourth most populous state says much about the scientific community's attitude toward radioactive waste.

Today, Gerusky, the director of the state's Bureau of Radiation Protection, maintains that the Penn State study is out of date.

New Nuclear Regulatory Commission regulations on land burial of low-level radioactive waste, Gerusky says, must be reviewed in selecting a burial site.

Because the Penn State study "did not take all of these regulations into account," he said, it is "therefore invalid."

Indeed, they are not Brewer's suggestion that uranium from reprocessing reactors be recycled for further use in existing reactors — one of the big selling points of reprocessing in the late 1980s and early 1960s, when the federal government first encouraged private industry to get into the business — has no economic merit today.

The reason: The United States is awash in uranium, and the last thing the industry needs is a fresh supply from a more expensive source.

That would be roughly akin to a municipality's building a desalination plant to make ocean water drinkable, rather than tapping existing reservoirs and ground-water supplies. There is so much uranium available that even the Edison Electric Institute, the electric utility trade group — which supports Barnwell as a "national asset" for the future — allows that its members are not exactly clamoring for uranium.

"There's so much uranium around because of delays and cancellations for new power plants — around meaning above the ground — that utilities are selling to each other off inventories," said Steven P. Kraft, a spokesman for the institute.

So much is around that uranium mining has fallen on its hardest times ever. An official of the Energy Department — the same Energy Department that is lobbying for Barnwell to open and turn out more uranium — had this response when asked what was happening in the uranium-mining business:

"There's just nothing. It's as simple as that. The mines are closed down or on standby. The mills that process the ore are closed down or on standby. There are a few that are operating, but few."

Gulf Oil symbolizes the plight of the industry. In its annual report to stockholders this year, the company offered a grim assessment of the uranium business.

Pointing out that "demand and prices slid to seven-year lows" in 1982, Gulf said its only "remaining uranium mine at Mount Taylor, N.M., was placed on standby status in November due to the depressed state of the uranium market."

Nothing like this had been expected. Eight years ago, a nuclear task force assembled by the Energy Research and Development Administration worried that the uranium mining and milling industry might not be able to satisfy the anticipated surge in demand.

Noting that "there is an increasing concern over the adequacy of uranium supplies by the mid- to late 1980s," the task force reported that industry would have to step up its exploratory drilling to find all the uranium that would be needed.

The task force added:

"In addition to the pronounced increase in drilling rates required, the mining and milling industry must open up hundreds of new mines as well as build about 66 new mills over the same time frame. It is estimated that this will require capital investment of about \$18 billion."

Since then, everything has changed in the nuclear-power industry.

Demand for electricity, which had been rising for years, suddenly flattened as the public grew concerned about conserving energy. Utilities found their customers rebelling at rate increases to finance nuclear plants. More and more communities became suspicious of plans to build reactors in their midst, especially after the accident at the Three Mile Island plant in Middletown, Pa., in March 1979.

Suddenly, the boom in nuclear power was over. No more new plants were being commissioned. Some that had been ordered were canceled by cost-conscious utilities.

And the projected surge in demand for uranium never came.

It is for this reason that federal energy officials talk of buying the other product of reprocessing, plutonium, for the breeder reactor, which uses it as fuel.

Because it runs on the plutonium, if not the single most lethal substance ever produced by a breeder, certainly one of the most deadly, a breeder creates safety and environmental hazards that do not exist at conventional nuclear plants.

Back in the 1950s, when Atomic Energy Commission officials promoted the wonders of reprocessing, they also extolled the marvels of a breeder reactor.

In those early years, federal officials envisioned breeders supplying most of the nation's electricity before the century was out. They endorsed the idea in part because they were sure uranium supplies were insufficient to keep conventional reactors going.

In the face of mounting congressional opposition, Reagan marshaled enough support largely through the arm-twisting of Senate Majority Leader Howard H. Baker Jr. (R., Tenn.), to keep work going on at Clinch River until this year.

But in May, the House voted overwhelmingly to cut off further funds, and last month the Senate beat back, by a surprising 16-vote margin, an attempt by Baker and Sen. McClure to rescue the venture with a one-time \$1.5 billion appropriation.

And that number is overstated, since the initial breeders would have been scrapped by then, their useful operating lives long past.

By way of comparison, during the 25 years the year is out. While success appears unlikely with the understanding that electric utilities

ROPES CORDON OFF A ROOM contaminated with radioactive dust at the West Valley reprocessing plant. Officials have yet to decide whether to tear the plant down, or simply seal it off from humankind for centuries.

at the moment, the Clinch River project has died and been resurrected before.

The government already has spent more than \$1.5 billion on the test breeder — about 90 percent of the hardware has been purchased, the site cleared and a 100-foot-deep hole the size of three football fields dug. It will cost an additional quarter-billion dollars or so to terminate the project.

Like so many others in government, President Reagan was captivated by the alchemist's lure of a power plant that turns out more fuel than it burns.

In truth, the statistics on this crucial selling point — even if they measured up to all the claims of the breeder's supporters — are not especially impressive.

France, which for years has been committed to nuclear development at any cost — a commitment that is just beginning to show signs of wavering — is building its own breeder, called the Super Phenix.

If everything works as the nuclear experts say it will, 30 years after the Super Phenix begins generating electricity it will have produced enough additional plutonium to start up a second breeder.

At that rate, if the United States put not one but three breeders into operation, it would take 120 years for those plants to multiply to 48. And that number is overstated, since the initial breeders would have been scrapped by then, their useful operating lives long past.

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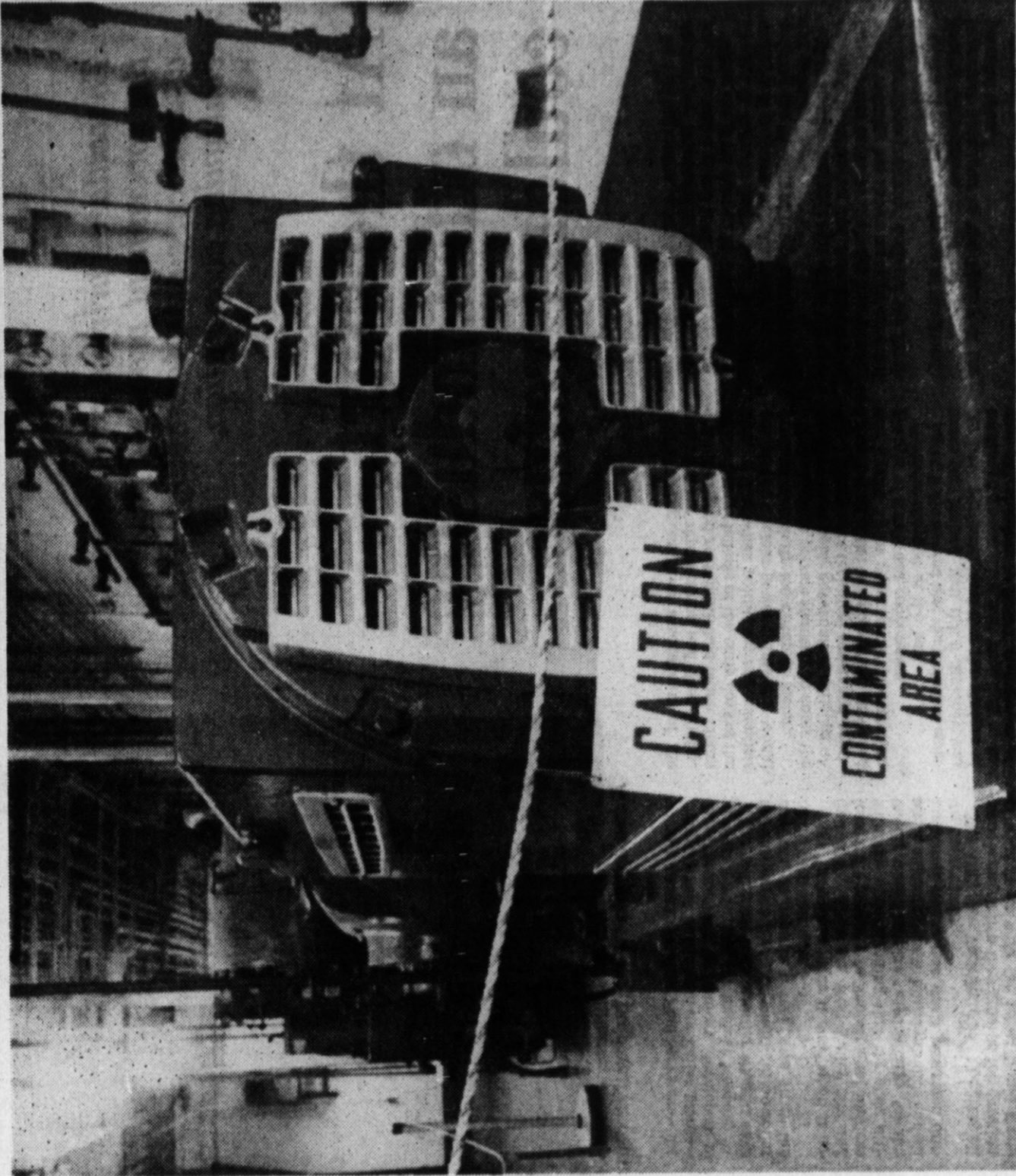
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Nuclear Waste in America



Philadelphia Inquirer / NICK KILSH

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To would-be private reproprocessors, the government promised expert assistance, sound technology and continuing cooperation.

At the start, an offer industry couldn't refuse

In the beginning, everyone thought the nuclear-fuel reprocessing plant at West Valley, N.Y., was a grand idea. When the plant opened in 1966, President Lyndon B. Johnson hailed it as "a splendid example of government-industry cooperation to bring the benefits of the peaceful atom to our country."

It is another instance where the U.S. government is following the sound policy of turning over to private industry a service for which industry has shown a competence and willingness to perform," declared the President.

Glenn T. Seaborg, chairman of the Atomic Energy Commission, called the plant "an important milestone in the history of the peaceful atom."

"It will have a significant role in the growth of our nation's economy and should make an important contribution toward a more effective system for the international control of nuclear energy," said Seaborg.

The President of the United States and the chairman of the Atomic Energy Commission, along with scores of lesser government officials, scientists and industrialists, turned out

when it gave to Nuclear Fuel Services — the company that built the West Valley plant — the reprocessing technology developed to produce plutonium for nuclear weapons.

The AEC made it even easier when it gave the company a five-year, multimillion-dollar contract to reprocess fuel rods from the AEC's own stockpile.

New York State made it easy when it acquired the 3,245-acre West Valley site and leased the property to Nuclear Fuel Services with the understanding that the state ultimately would assume responsibility for the plant, adjoining waste burial grounds and all high-level radioactive waste generated during reprocessing.

The AEC, New York State and Congress all made it easy when they ignored the question of what to do with the lethal liquid waste produced during reprocessing, and instead permitted Nuclear Fuel Services to store it in underground tanks until a permanent solution could be found.

The West Valley plant opened in 1966. It took the owners of Nuclear Fuel Services — W.R. Grace & Co., which held 76 percent of the stock, and American Machine & Foundry, which held 22 percent — little more than a

year to discover that the real economics of reprocessing would not match paper projections.

In a report to stockholders in 1978, Grace allowed that "start-up problems occurred and had more impact on production than would have been the case with a less complex process. The result was a loss for the year."

Nonetheless, the company remained outwardly confident. "The problems encountered to date in the operation of this plant have been solved and there is every reason to expect more reliable operation in the future," the company said.

Grace's optimism was unfounded. A year later, without saying that it had failed to achieve a "more reliable operation," Grace told its stockholders that it intended to get out of the reprocessing business, explaining the decision this way:

"We have often expressed the belief that management not only needs to recognize new opportunities for profitable growth but also should identify operations or businesses which are no longer compatible with the company's long-range objectives.

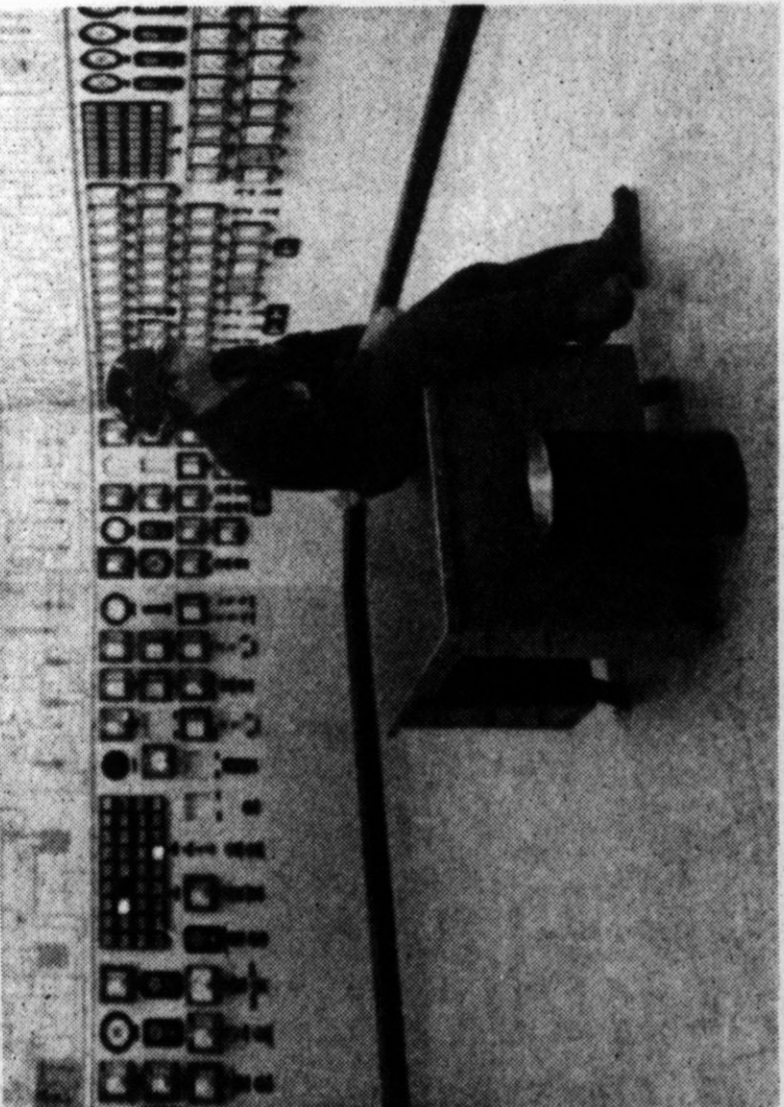
"In accordance with this belief, several units have been sold or are the subject of negotiations," he explained.

"When it's all said and done, an exemption would lend credibility to the notion that a low-level site is not safe and someone doesn't want it. I believe that if it is properly done and enough money spent that it could be done properly. We should not exclude any state."

The small states failed to win the exemption clause when the proposed compact was approved by delegates in February. Now, some of them are threatening to pull out.

The Maine legislature refused to act on the tentative agreement this year. Instead, it passed a bill requiring legislative approval of low-level waste facilities in the state, if he so desired, from issuing an executive order allowing Maine to join the Northeast compact.

Maine is now exploring the possibility of linking up with New Hampshire and Vermont in a New England regional compact.



A worker sits in the inoperative control room at the West Valley plant...

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But as is typical of the politics that engulf radioactive-waste issues, leaders in those two states are divided on whether to join Maine.

Gov. John Sununu of New Hampshire favors the 11-state Northeast pact, but State Rep. Edward Parr, chairman of the House State-Federal Relations Committee, opposes it.

The inadequacy of the state funds is illustrated by the case of the Sheffield, Ill., nuclear dump, about 125 miles west of Chicago.

From 1967 to 1978, when the burial ground was open, the operators paid about \$196,000 to the state of Illinois to maintain the site after it closed.

Illinois did not bother to set up a special account for the money for nine years. Instead, during that period, about \$115,000 in "perpetual-care" contributions flowed into the state's general fund and was spent for other purposes.

WHAT IS A COMPACT?

Congress in 1980 ordered the states to assume responsibility for all low-level waste produced within their borders. It urged the states to form regional compacts and establish one burial ground to serve several states. So far, legislatures in 32 states have voted to join one of the six regional pacts that have been proposed. An additional 14 states have participated in the forming of compacts, but have not yet decided to align with any of the compacts and may have to build their own dumps or petition one of the compacts for membership. Congress gave the states until Jan. 1, 1986, to have the new system in place.

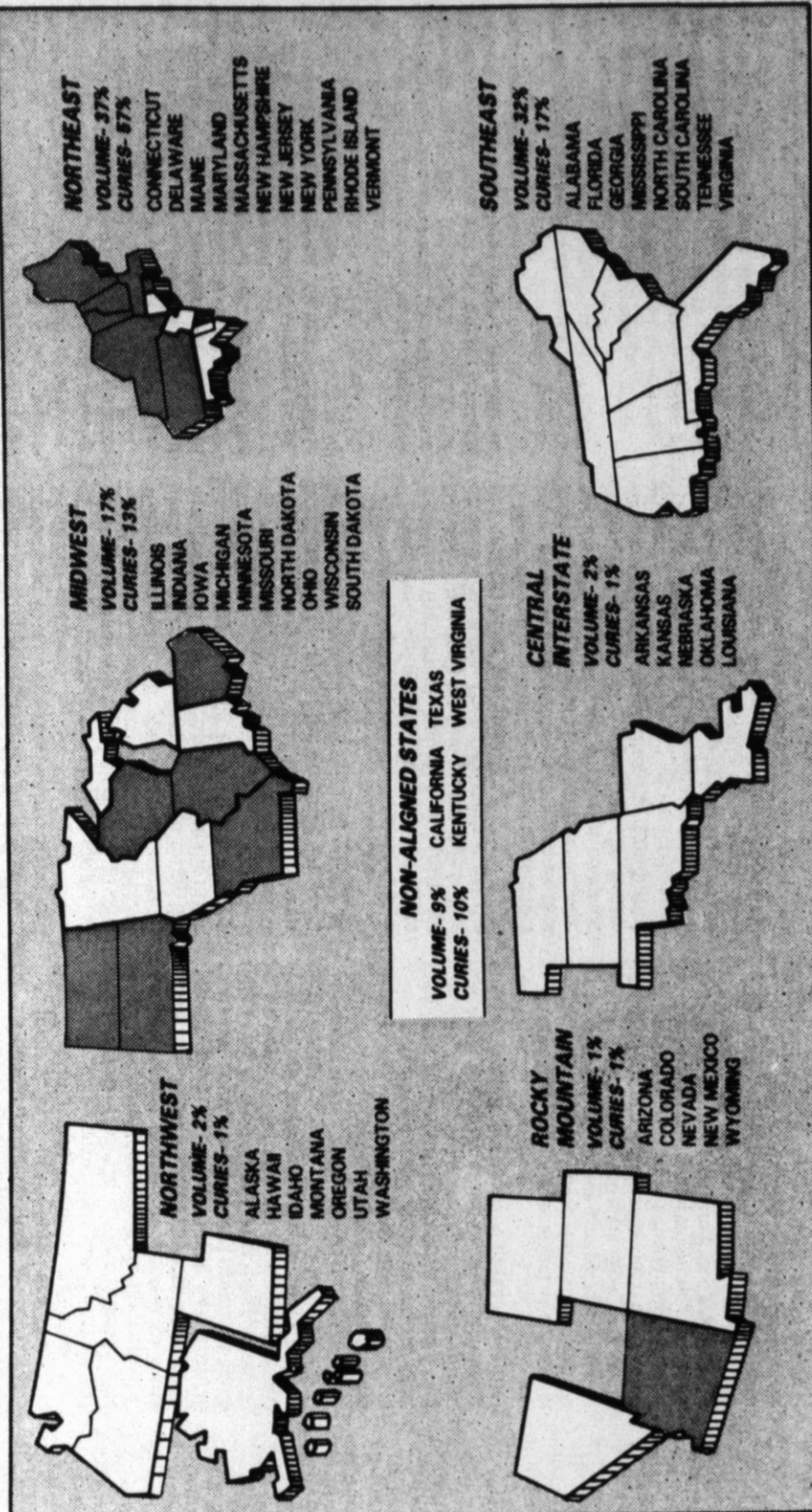
KEY

STATES WHICH ARE ELIGIBLE TO JOIN A COMPACT BUT HAVE NOT AS YET JOINED

VOLUME - PERCENT OF TOTAL LOW-LEVEL WASTE PRODUCTION IN U.S., 1979-81 AVERAGE

CURIES - PERCENT OF TOTAL RADIATION FROM LOW-LEVEL WASTE

How states are grouped in proposed or existing compacts



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In 1976, the state finally established a perpetual-care account, which took in about \$83,000. The fund now contains about \$38,000.

Since the account was established, radioactivity has seeped out of the burial ground. The cost of correcting it, according to one federal estimate, could be as high as \$18 million.

So Illinois' perpetual-care fund, designed to finance repairs, surveillance and maintenance for hundreds of years, has enough money to pay for about one day of work during a two-year cleanup at Sheffield.

But questions of long-term responsibility are far from the only issue dividing major producers of nuclear waste.

For instance, Pennsylvania and New York — neither of which is currently considering legislation to join the Northeast compact — are unhappy with Massachusetts.

In November 1982, Massachusetts voters approved a referendum that sets up an elaborate review and approval process to be established before a radioactive-waste site can be established in the state. Many observers believe that any effort to open a dump in Massachusetts is Dr. Walter H. Ploisla, deputy secretary for technology and policy development in the Pennsylvania Department of Commerce, questioned whether Massachusetts could bargain in "good faith" with other Northeastern states.

"Massachusetts would have their cake and eat it too," he said. "It might sign on to the compact but would know it would never have to host a site because of its elaborate internal processes of the public referendum."

All of this has helped create the impression among many in the Northeast that the low-level waste issue will not be solved by the compact route.

A negotiator for a Midwestern state who spoke to one of the Northeast negotiators at a national waste-management meeting some months ago came away with the feeling that the Northeast faces "insurmountable problems."

"I remember talking to one gentleman from an Eastern state who shook his head and said, 'I'm not sure which way we're going or how we're going to get there,'" recalled Dan Drain, former director of environmental resources in Nebraska.

Although negotiators of the Northeast compact speak confidently of someday establishing a burial ground somewhere in the region, some are privately concerned over whether the populous, humid, rainy Northeast is a proper locale.

Nuclear Waste in America

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Set up nuclear dumps, where some lethal radioactive materials will be buried, in communities across the country. Put some of the dumps in unsuitable areas, where rainfall may carry off radioactive particles to contaminate adjoining land. Take steps that will drastically cut back the volume of waste that can be buried at two of the three existing dumps, at a time when more burial capacity is needed. Permit political parties rather than science and industry to determine the locations of future burial grounds. Follow a plan that could lead to the proliferation of state dumps, thus increasing development costs and imposing on future generations a greater obligation to watch over the radioactive burial grounds. Carry out a law so vague and poorly worded that states are not certain of what powers it gives them. Add another layer of nuclear bureaucracy — interstate compact commissions — to the already bewildering maze of agencies that have responsibility for regulating nuclear waste.

The politics of waste. While nuclear supporters lobby, resistance stiffens

In retrospect, the political infighting that has mushroomed as a result of the 1980 act should have been foreseen when Congress tossed the problem of commercial low-level waste into the states' laps. For in the years leading up to 1980, nuclear waste had become an increasingly contentious issue at the state and local levels. As concern rose over possible environmental damage and the health effects from radioactive pollution, states and local governments enacted laws to restrict the burial, storage or transportation of nuclear waste.

Alabama, Maryland, Michigan, Oregon, Indiana and Louisiana passed laws banning the disposal of all radioactive wastes. Connecticut, Illinois, Montana, New Hampshire, South Dakota, Texas, Vermont and West Virginia banned the disposal of high-level wastes only. Colorado, Connecticut, Kentucky, Louisiana, Maine, Minnesota, Mississippi, New Hampshire and North Dakota decided to require legislative approval before nuclear waste could be buried. Kansas passed a law prohibiting geological investigations of possible burial sites without notification of the governor and the legislature. Louisiana passed a law forbidding the transportation of high-level waste into the state for any purpose. At the local level, counties, cities and towns adopted ordinances aimed at restricting the transportation of nuclear waste. So it was into a highly charged political atmosphere that Congress decided in 1980 to place responsibility for solving the nation's low-level waste problems.

The term "low-level waste" may have helped to smooth the bill's passage. Nuclear-industry supporters in Congress, such as Rep. Mike McCormack, a Democratic congressman from Washington for five terms before his defeat in the last election, have often given the impression that the bulk of this category of waste is produced by hospitals and medical schools. McCormack — known as "Atom Mike" on Capitol Hill — said at the start of hearings in

forming interstate compacts for years. But earlier efforts involved less volatile issues, such as allocating water rights to rivers that pass through many states.

Even so, it often took years to get a compact in place. A quarter-century elapsed between the start of negotiations and final approval of a four-state compact in the Southwest that spelled out state rights to water from the Red River.

But Congress, in the Low-Level Radioactive Waste Policy Act of 1980, gave the states only six years to organize themselves to handle the much more controversial and politically sensitive issue of radioactive waste.

"To think the states are now going to get together and do this real fast gives you another thing to think about," says Ed Pugh, an aide to Oklahoma Gov. George Nigh. Saddled with an ambiguous, poorly drafted law, the states have ventured forth in search of regional partners. So far, progress has been slow.

There are old state rivalries to face. There are the usual political problems. At a meeting of negotiators for a Northeast compact late in 1982, Rhode Island's representative said that the proposed agreement would have to be submitted to his legislature early this year, if there was to be any hope for seeing it enacted. "If we submit something like this close to the [March] filing deadline or the state legislature, we would get killed," said Dan Itona. "If we must have this in by January or February, if they are going to consider it this year."

Proposed compact was not introduced until March in the Rhode Island legislature, and the lawmakers adjourned without approving it. Even the steps necessary to form a compact are complex and cumbersome. If Rube Goldberg had ever lavished his talents on government organization, he could not have concocted a more muddled process than the one confronting the states in trying to comply with the 1980 act.

First, each state has to decide which other states it wants to team up with. Then it must appoint representatives to a policy committee, which has to develop a proposed agreement for the region. Then the agreement must be submitted to each state's legislature.

No legislature can make substantive changes in the proposed pact without sending it back to the bargaining table. This inability of state legislatures to offer amendments is seen as one of the major stumbling blocks ahead. After a minimum number of a region's legislatures (usually three) have approved the compact agreement, it then must be submitted to Congress.

Just what would happen if Congress objected to the compact is not clear. Presumably it would go back to the states, where it would have to be renegotiated and sent through the legislatures again. But perhaps the most serious obstacle facing the states in trying to set up regional compacts is that the intensity of the low-level waste problem varies greatly among them. Although every state produces some commercial low-level waste, the volume differs radically. Take the case of two southern states, Alabama and Mississippi.

Consequently, the states, when they approach the bargaining table, have very different interests to protect. Small generators are fearful of large generators and do not want to be forced to accept nuclear waste from outside their borders. The large generators are quite often populous states, meaning that the land available for burying radioactive waste within their borders is limited.

So far, negotiations around the nation have been aimed in great part at isolating the large generating states or forcing them to consider volunteering as regional dumps. Steps toward regional compacts have encountered the fewest problems in those areas with burial grounds already in existence — Washington, the Rocky Mountains (Beatty, Nev.) and the Southeast (Barnwell, S.C.). Yet even in one of those regions, the Southeast, there have been complications.

Although eight Southeastern states have approved legislation to join the compact, South Carolina, which would provide the first burial site at the existing Barnwell nuclear dump, attached special conditions to its membership. The compact calls for the Southeast regional commission to begin a search for a new burial site to replace Barnwell by 1991.

In the legislation approving the compact, South Carolina sent a stiff warning to its neighbors: "If any member state refuses to accept its designation as a host state, then South Carolina shall immediately withdraw from the pact." In other words, if the Southeast states should encounter snags in developing a new burial ground, the region suddenly might find itself without any place to put its low-level waste. Negotiators in the Middle West had little difficulty reaching a proposed compact agreement, but so far only four of the 10 eligible states have approved it. And Illinois, the pivot state, which churns out 52 percent of the region's waste, has given signs that it might try to go it alone, thus upsetting plans for that compact.

In the Northeast, much fear — and maybe a renegade compact

Of all the regions attempting to establish a low-level waste compact, the Northeast is having the most difficulty. It is in the Northeast where the fallacy of the 1980 low-level waste act — that states have common waste problems and should get together to take care of them — is most apparent.

In the same proposed regional pact are found Pennsylvania and New Hampshire, states with vastly different perspectives. Pennsylvania generated more low-level commercial nuclear waste every 32 hours in 1981 than New Hampshire produced all that year. The region's small generating states — Maine, Vermont, New Hampshire, Rhode Island and Delaware — produce only 5 percent of the Northeast's commercial low-level waste. Pennsylvania, Connecticut and Maryland generate 95 percent of it.

Given this gap, the small generating states in the Northeast distrust the larger states, and are fearful that the large generators might try to impose a burial ground on them. This anxiety produced some curious proposals by negotiators of the proposed Northeast pact during the two years they spent drafting

negotiations for sale. . . . Contemplated sales in 1969 include the remaining . . . interest in Nuclear Fuel Services. So it was that Getty Oil Co. acquired Nuclear Fuel Services in 1969. The new owner brought with it a fresh enthusiasm for reprocessing.

Within months, Getty announced expansion plans to increase reprocessing capacity to "three tons per day" in order "to keep pace with the increasing construction of nuclear-powered generating plants." In fact, Getty fared no better at reprocessing than its predecessors. In 1972, after it had reprocessed all the used fuel rods then available, Nuclear Fuel Services shut down the West Valley plant.

At the time, the company announced that it intended to expand capacity from 300 to 600 metric tons a year — essentially the same production increase announced in 1969 — and to make other modifications to improve waste handling, reduce workers' exposure to radiation and remedy operating deficiencies. The shutdown, which was to last only two years, came in the midst of a series of changing government regulations that imposed

with a firm "no." In its annual report to stockholders last year, the company summed up the future like this: "GE does not anticipate recovery of the domestic nuclear steam supply systems market in the foreseeable future." The picture is much the same for the foreign market. One of those inducements is reprocessing. Incredibly, the U.S. government that promised reprocessing to American utilities in 1956, to encourage them to build nuclear power plants, now is making the same offer to foreign countries, to encourage them to build nuclear power plants.

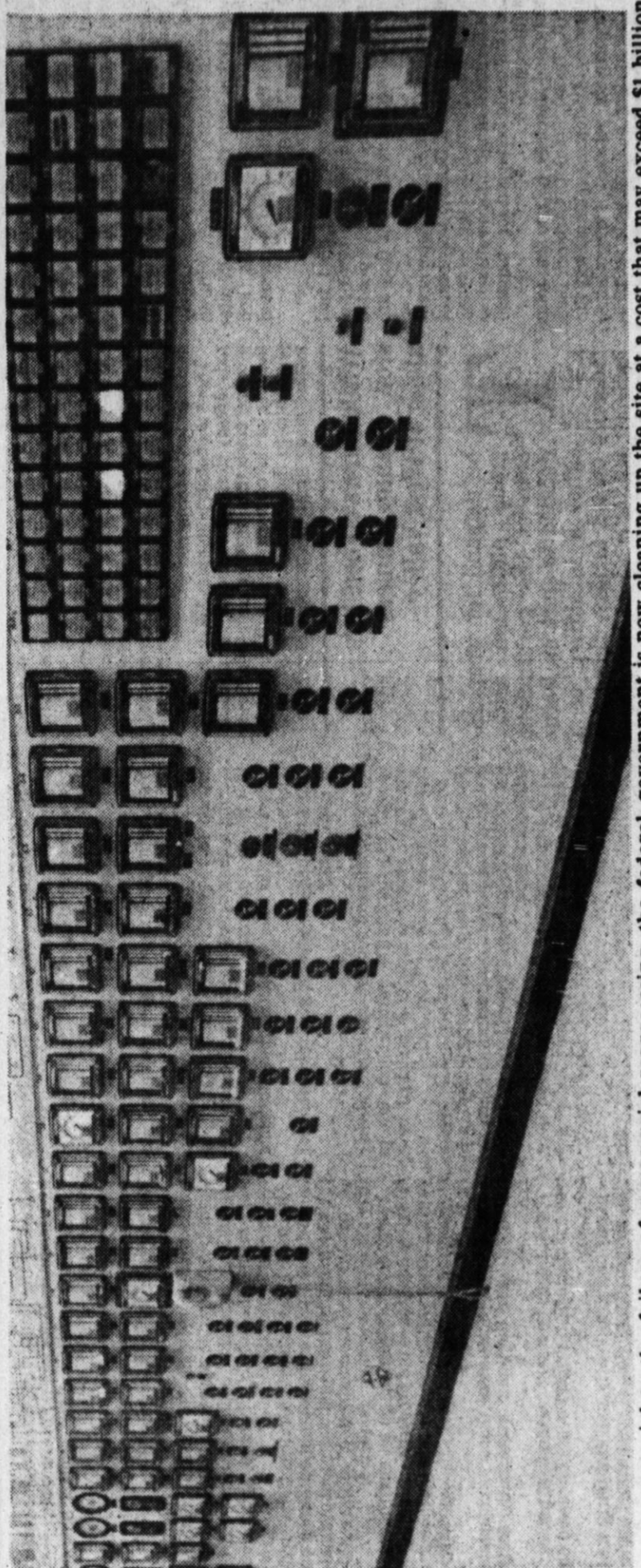
In January 1982, three members of President Reagan's cabinet — Secretary of Energy Edward M. Rumsfeld, then-Secretary of State Alexander Haig and Commerce Secretary Malcolm Baldrige — jointly sent a diplomatic cable to the Mexican government offering broad-based support for the development of nuclear power there. "We ascribe very high priority to working with Mexican authorities to develop a stable and long-term framework within which U.S. industry and the U.S. government can provide nuclear fuel, reactor components and other equipment, services, technology and manpower training and development," the cable said.

While there is little likelihood of a resurgence in reactor sales in this country — indeed, cancellations continue to trickle in — there remain large, untapped markets abroad. Last year, U.S. exports of nuclear fuel and

To promote the growth of nuclear power in foreign countries, and with it the sale of American technology, U.S. officials have offered a variety of inducements, just as their counterparts did a quarter-century ago when they encouraged American utilities to build nuclear power plants. One of those inducements is reprocessing. Incredibly, the U.S. government that promised reprocessing to American utilities in 1956, to encourage them to build nuclear power plants, now is making the same offer to other countries, to encourage them to build nuclear power plants.

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... a memorial to the failure of commercial reprocessing; the federal government is now cleaning up the site at a cost that may exceed \$1 billion

tougher requirements on nuclear facilities. While the company studied the costs of complying with the revised regulations, work on major parts of the modernization program stalled. Finally, in 1976, Nuclear Fuel Services informed New York State authorities that it intended to turn over all radioactive waste at the site to the state — as provided under the reprocessing business.

The reprocessing plant — indeed, the entire Western New York Nuclear Service Center experiment, with its low-level waste burial grounds and high-level waste storage tanks — was an economic disaster and a technological failure. Over a six-year period, the plant operated at only one-third of its design capacity, reprocessing 640 metric tons of used fuel rods. About three-fourths of the rods were supplied by the AEC, and the remaining one-fourth by electric utilities.

Accidents involving radioactive contamination within the plant were chronic. On one occasion, ruptured fuel rods were placed in a storage pool, where they leaked radioactivity into the water. The three cabinet officers outlined a variety of nuclear services that the U.S. government would make available. They urged the purchase of American-made reactors — because U.S. companies have an unsurpassed capability to assist the Mexican program.

And they invited Mexico to reprocess its nuclear fuel at Barnwell or to acquire an interest in the plant. "We are encouraging the establishment by the private sector of a commercial reprocessing industry within the United States. Such other countries in the future, and we would welcome Mexico's interest in acquiring such services or in becoming a close partner in U.S. ventures."

What would happen to the large volume of radioactive waste that would be produced if Mexico or some other country took the U.S. government up on its reprocessing offer? That, told The Inquirer, a State Department spokesman, asked about "if we did in fact agree to reprocess fuel for some other country, I assume we would handle the waste products the same way we already are handling those in our government program."

While the United States does not need more nuclear waste, or more used fuel rods, or more uranium, it could use more plutonium to make nuclear weapons. There are but two obstacles to the use of commercial reactor fuel for that purpose — one technological, the other political. Both could be overcome. Congress has steadfastly maintained that civilian and military uses of

of its effect on the body.) A number of the temporary workers, who were as young as 18, received the maximum dose in a matter of minutes and were promptly replaced by a fresh supply of transients. For Nuclear Fuel Services, there was little choice. The company's only other option was to assign its own skilled employees to the repair and maintenance tasks, then lay them off after they had accumulated the allowable radiation dose.

A report by the Nuclear Regulatory Commission, which, along with the Energy Department, took over some of the AEC's functions when that agency was abolished, shows that, from 1969 to 1971, the plant's last full year of operation, the number of workers who received annual radiation doses ranging from 1.25 to 12 rems soared by 206 percent, rising from 186 to 576. As a general rule, a worker is permitted to receive no more than five rems a year, although under certain conditions the maximum dose may be increased to 12 rems.

For comparison: If every American received one rem over the course of one year, about 46,000 people could be expected to die of cancer as a result. Roughly translated, that means that the federal government, which has been storing high-level radioactive waste temporarily for four decades now, would take in high-level waste from foreign countries and store it temporarily too.

There is, of course, an option other than reprocessing that the United States could offer to foreign buyers of American reactors. Said the same State Department spokesman: "Another alternative would clearly be simply to take back the spent (used) fuel, but do nothing with it, simply store it." That is what electric utilities have been doing since the first reactor started up in 1957 at Shippingport, Pa., all the time waiting for the government to come up with a permanent storage plan.

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FOREVERMORE.

nuclear power must be kept separate to set an example for the rest of the world and to discourage other countries from converting power-plant fuel into nuclear weapons.

Yet it was not until last year that the lawmakers finally enacted legislation prohibiting the reprocessing of commercial reactor fuel to produce plutonium for the military.

But the ban was accomplished largely through a parliamentary maneuver, with an amendment tacked onto the Nuclear Regulatory Commission appropriations bill, and some believe that the policy could be reversed if Barnwell were to start up.

The reasoning goes like this:

If Barnwell began reprocessing used fuel rods, its operators would have to store the plutonium against the day it would be needed for commercial breeder reactors, if they are ever built.

In the meantime, if the Energy Department finds it difficult to meet Defense Department requirements for plutonium, the growing stockpile at Barnwell would offer an attractive alternative that could be tapped for "national security" interests.

In a letter dated March 29, 1982, to Sen. John G. Tower (R., Texas), Frank C. Carlucci, then deputy secretary of defense, explained why the Defense Department believed it essential to have civilian nuclear fuel available for military purposes if needed.

"The option to use civilian plutonium in the weapons program should not be foreclosed," Carlucci wrote, "because we may need to provide for a sudden, unforeseeable increase in need resulting from an overriding national security requirement or from a calamitous interruption in the plutonium production complex."

"I note," he added, "that this option remains open to all other nuclear weapons states."

Some members of Congress agree. In a report issued in July 1981, the Senate Armed Services Committee fretted over a looming shortage of the plutonium needed to upgrade nuclear weapons.

"The committee remains concerned," the report said, "over the availability of the special nuclear materials that will be needed for weapons production and modernization in future years."

To produce enough plutonium just to get through the 1980s, the committee said, would require the start-up of two currently closed production reactors, one at the Savannah River plant near Aiken, S.C., the other at Richland, Wash., as well as the government reprocessing plant at Richland.

Beyond the 1980s, the committee warned, the government will require "one or more new production reactors" to turn out plutonium.

The Energy Department, which operates all nuclear-material production facilities for the Defense Department, does not expect to have another production reactor in place until about 1994.

And that, the Senate Armed Services Committee said, "may be too late."

The committee offered another solution, one favored by the President:

"With the decision of the administration to pursue commercial reprocessing, it may be technologically feasible to separate weapons-grade materials during reprocessing using laser technology . . ."

"The committee has included additional authorization for a pilot facility that would demonstrate the technological feasibility of laser isotope separation."

This is what lies behind the committee's thinking.

The ideal nuclear weapon material is plutonium 239. But fuel rods in a nuclear power plant produce several forms of plutonium in addition to 239, including plutonium 240, an isotope not especially suited for advanced weaponry.

At present, there is no established process for isolating the bomb-grade plutonium 239 from other forms of plutonium.

For several years now, government scientists have been experimenting with a laser

technology that could be applied to reprocessed civilian reactor fuel to separate out the desired plutonium 239.

If the laser technology works as expected—Exxon Corp. developed a similar technology for uranium—then it could be employed in conjunction with the Barnwell reprocessing plant to satisfy Defense Department plutonium demands for years to come.

There is enough plutonium 239 in used fuel rods already stored at nuclear power plants to produce more than 10,000 atomic bombs. By the turn of the century, there will be enough plutonium in the accumulated rods to manufacture many times that number of bombs.

While Barnwell boosters stew, cleanup simmers along at West Valley

The demand for weapons-grade plutonium aside, even if the government decided to start up Barnwell as either a subsidized or a federally owned facility, there are indications that it would operate no better than its predecessor at West Valley.

In a report prepared in September 1981, the nuclear planning and analysis office of the Argonne National Laboratory offered this comparison of the two plants:

"Because of the fundamental philosophical, dimensional and fabrication details for the design, full scale operation of the [Barnwell] plant would be accompanied from the moment of start-up by inordinately high operation and maintenance risks.

"With respect to operation and maintenance, the [Barnwell] design and construction is unfortunately no better than that of the Nuclear Fuel Service plant at West Valley in the event of mishaps in the liquid handling parts."

Although the report noted that Barnwell's owners were confident that the plant would function properly, it added:

"Independent groups which have reviewed the [Barnwell] plant are fearful that it could suffer the same fate as Nuclear Fuel Service's West Valley plant and give the industry a further black eye."

"Specifically, they fear that the first serious contamination in the liquid section of the facility might require that the entire plant be written off from further fuel reprocessing and, perhaps, other uses as well."

"Thus, the question arises as to whether the [Barnwell] plant should ever be completed and be permitted to start up."

When parts of the critical Argonne study appeared in an Energy Department booklet distributed publicly in January 1982, Reagan administration officials—then hard at work trying to sell private industry and Congress on the need for opening Barnwell—rejected the findings.

In a two-page letter addressed to recipients of the Energy Department publication, Shelby T. Brewer, assistant secretary for nuclear energy, dismissed the plant's reported shortcomings. Saying that the opinions expressed in the article were "inappropriate for this publication and their inclusion was the result of an incomplete staff review," he declared:

"All things considered, I do not believe there are any intrinsic deficiencies in the Barnwell plant design that will preclude its successful operation, and I am confident that any problems which may develop can be overcome."

Support for Barnwell also has come from the engineering community.

In an article published in Nuclear Engineering International in August 1982, three officials of Bechtel National Inc., a part of Bechtel Group Inc., the San Francisco-based global engineering and construction company, described Barnwell's importance:

"The most expeditious and cost-effective approach to re-establishing commercial reprocessing is to complete Barnwell. The reality is that Barnwell exists."

Bechtel was the company that designed and built also was the general contractor at West Valley.

The optimism of federal officials, industry executives, Barnwell's owners and others about the plant's prospects is matched by a new optimism today at West Valley.

Only here the high hopes are not for reprocessing, but for the ability of the federal government and private contractors to clean up the radioactive disaster left behind by reprocessing's failure.

The Department of Energy has taken over West Valley as a "demonstration project" under a bailout plan adopted by Congress under pressure from New York State.

In effect, the state's political leaders, who went to Capitol Hill in 1959 to persuade Congress to amend federal statutes so West Valley could be built, returned to Capitol Hill in 1980 to persuade Congress to allocate upward of a quarter-billion tax dollars to correct West Valley's mistakes.

Under the terms of the agreement, the federal government will pick up 90 percent of the tab, and New York will pay 10 percent. That tab is now expected to total at least \$300 million; it could rise to more than \$1 billion if a decision is made to restore West Valley to a radiation-free state.

The project calls for the Energy Department and its contractor, Westinghouse Electric Corp., to "demonstrate" the technology for solidifying high-level radioactive liquid waste—a technology that government and industry both insisted years ago already was proven.

For the next several years, the work will center on devising a method to extract and solidify the 572,000 gallons of liquid waste in the two underground storage tanks—560,000 gallons in one tank, 12,000 in the other.

It is estimated that there are three dozen different radioactive materials in the two tanks, including about 77 pounds of plutonium, enough to make several atomic bombs.

The radiation level inside the two tanks is put at about 39 million curies.

To solidify the liquid waste, the Energy Department and Westinghouse also must figure out how to remove the sludge that has settled on the bottom of the tank holding 560,000 gallons.

No one knows the exact content or consistency of the sludge, although it is believed that most of the radioactive materials have settled in it, making the removal task even more difficult.

What's more, no one is certain of the sludge's depth. A Nuclear Fuel Services calculation placed it at just under five feet. (According to an Energy Department report, the company measured the sludge by dropping a bottle tied to a string into the tank and noting "the point at which the string went slack.")

In addition to removing the sludge and solidifying the liquid waste, the Energy Department and Westinghouse also will decontaminate the reprocessing plant itself.

At some point, a decision will be made either to dismantle the facility piece by piece and cart it to a burial ground in some other state, or to seal off the building and grounds for hundreds of years.

Also to be determined at some future date is whether the radioactive garbage buried at the site will be dug up and moved to another state, or whether it, too, will be left in place.

In the meantime, the cleanup proceeds at a measured pace as company after company re-

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tained by the Energy Department goes about its particular assignment. For example, Rockwell International Inc. studied how to secure samples of the deadly liquid in the underground tanks, how to better measure the volume of the sludge, and how to identify the various radioactive materials in it.

General Atomic Co. studied the planned transportation systems "to assure that the waste transportation approach complies with regulations" and that radiation exposure of workers and the public is held to "the lowest reasonable achievable" level.

Burns & Roe Industrial Services Corp. studied the potential use of existing buildings on the site to solidify the liquid waste and evaluated "options for decontamination" of the building after the project is completed.

Dames & Moore worked on an environmental safety analysis of the property, including "a position paper on seismology and earthquake engineering, geology and hydrology activities."

The Energy Department plans to complete solidification of the liquid waste in the early 1990s.

If that happens, it will be the first nuclear-waste management project ever completed on schedule.

In any event, two early statistics fairly well sum up the current state of commercial nuclear fuel reprocessing.

From 1962 to 1984, the Energy Department will spend \$62 million on the preliminary stages of the cleanup. That is almost two times what it cost to build the entire West Valley reprocessing complex.

And—assuming that the solidification deadline is met—the government will have spent two years to clean up a reprocessing plant for every year the plant actually operated.

Although reprocessing as a commercial industry is dead in the United States, many of its supporters continue to speak of it as a proven and successful technology that actually exists.

Last month, Philadelphia Electric Co. distributed reprints of an article by Bernard Cohen, a University of Pittsburgh professor, that criticized the news media for provoking unwarranted hysteria over nuclear power, radioactive waste and radiation.

Declaring that journalists had misinformed the public through "their highly unbalanced treatments and their incorrect or misleading interpretations of scientific information," Cohen singled out radioactive waste as an example.

"Another favorite article of [journalists] is the so-called unsolved problem of disposal of high-level radioactive waste," Cohen stated. In fact, he wrote:

"The solution planned for high-level waste is well known and very simple: High-level waste will be converted into rocks and put where natural rocks are, deep underground."

Not so.

While converting waste "into rocks" has been the answer put forth on paper ever since the 1950s, it is not now reality, and will not become so for decades—if ever.

In addition to all the technological and environmental problems that remain to be solved, the economic drawbacks of commercial reprocessing are currently insurmountable.

So what, then, does the future hold for the millions of used fuel rods accumulating at nuclear power plants?

Now that there will be no reprocessing, the federal government declares—with the same confidence it once displayed in promising reprocessing—that it will bury the fuel rods intact in an underground repository.

And, as with reprocessing, it insists that the technology for a repository is well in hand.

Says the Department of Energy:

"More than 20 years of research support DOE's confidence that the mined geologic disposal system can meet the goal of effectively isolating highly radioactive wastes from the environment. . . . Isolation of the waste will be effective for 10,000 years."

be developed and taken care of for hundreds of years.

Instead of a handful of burial pits in a few states, there eventually could be 50 such facilities—increasing the odds for contamination of the environment and imposing an ever-greater burden on future generations to provide care and oversight.

The federal government has publicly insisted for years that long-term care of nuclear-waste sites should be no problem. But internal papers from the Nuclear Regulatory Commission, turned up in The Inquirer's investigation, suggest that not all federal officials are so confident.

In a 1980 report on a proposed low-level waste site in a Kansas salt mine, an NRC licensing official observed:

"Although it may not be intended by today's planners and lawmakers, it is quite possible that a program of surveillance and retrievability lasting centuries may not be acceptable to future generations. It may be a legacy that is beyond their capabilities or intents."

Lastly, one of the ironic twists of the 1980 act is that, while it supposedly is aimed at providing more burial capacity, it will have the effect of virtually closing down two of the three commercial dumps now in operation.

At the Richland site in Washington, the volume of waste to be buried would decline by more than 95 percent once the Northwest compact begins to function, excluding waste from outside the region.

That is because the seven states that are

members of the region—Alaska, Hawaii, Idaho, Montana, Oregon, Utah and Washington—generate only about 75,000 cubic feet of low-level waste a year, or 2 percent of the national total.

By contrast, Richland now buries about 1.4 million cubic feet of waste trucked in from about 40 states each year.

Based on the Northwest's current production rate, the 100-acre Richland facility has enough unused capacity to take care of the region's low-level waste for 78 years.

Thus, if both the Northwest and Rocky Mountain compact were in operation, the existing Western sites would receive just 3 percent of the nation's waste.

Here, then, is what Congress has in effect told the states to accomplish by 1996:

Nuclear Waste in America

Similarly, the commercial dump at Beatty, Nev., would only handle a fraction of the waste it now does if the proposed Rocky Mountain compact is approved.

The burial plot then could accept waste from five states—Arizona, Colorado, Nevada, New Mexico and Wyoming. Together, the five generate only 25,000 cubic feet of waste a year.

At the current production rate, Beatty has enough land to handle the waste of the Rocky Mountain compact for 79 years.

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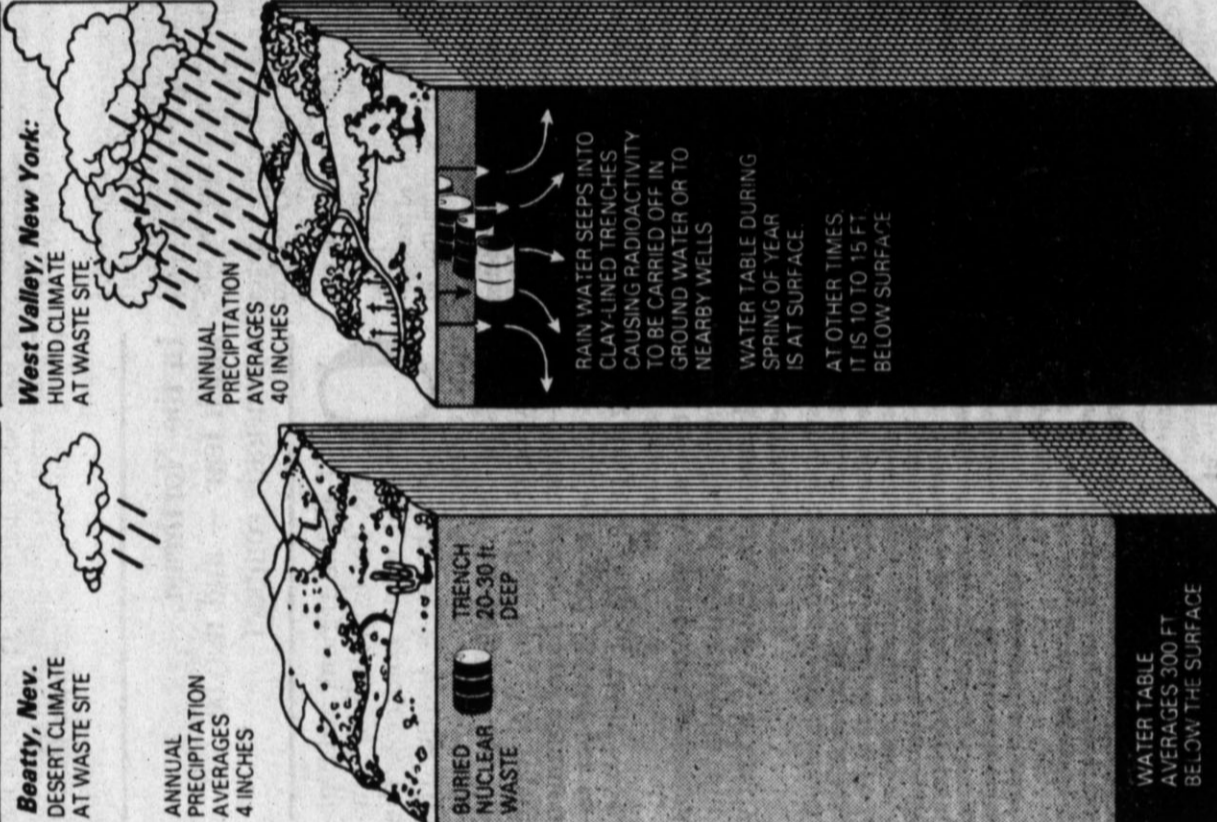
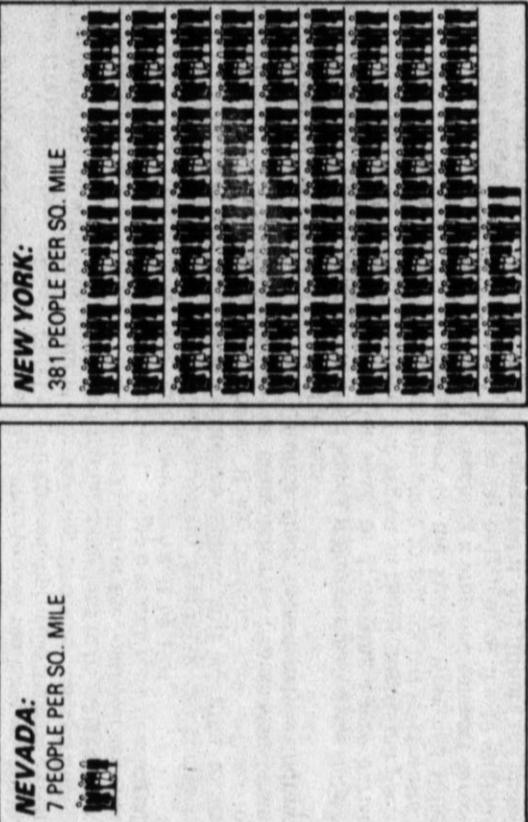
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Typical site problems



Barrels of radioactive garbage lie jumbled in a trench at Maxey Flats, Ky.

A crane hoists a cask of waste headed for a burial trench at Barnwell, S.C.

Philadelphia Inquirer / NICK KELSH

Philadelphia Inquirer / JOHNSTONE QUINN

PART FOUR

Used fuel rods: Congress' game of hide-and-seek

Herewith a quiz on the policy the federal government is most likely to follow in dealing with the high-level radioactive waste piling up in the United States.

For the next half-century, or possibly forever, the intensely radioactive used fuel assemblies from nuclear power plants will be stored in:

- (a) Plymouth County, Mass., a rich historic and recreational area — Plymouth Rock, Pilgrim houses from the 1600s, beaches and boating facilities — with a population of 620 people per square mile.
- (b) St. Lucie County, Fla., a recreational and farming center along the Atlantic — miles of beaches, fishing spots, cattle and citrus crops — with a population of 150 people per square mile, or 550 counting tourists.
- (c) Middlesex County, Conn., a center for farming (nursery stock), manufacturing (jet engines) and insurance (Aetna), with a population of 350 people per square mile.
- (d) York County, Pa., a fertile farm district — the state's largest grower of barley, second-largest producer of chickens, corn and winter wheat, and third-largest producer of peaches, potatoes and hogs — with a population of 340 people per square mile.
- (e) Nye County, Nev., a vast desert wasteland where atomic warheads are tested — more than 600 have been exploded there over the years — with a population averaging one-half person per square mile.

If you guessed (a), (b), (c) or (d), you are correct.

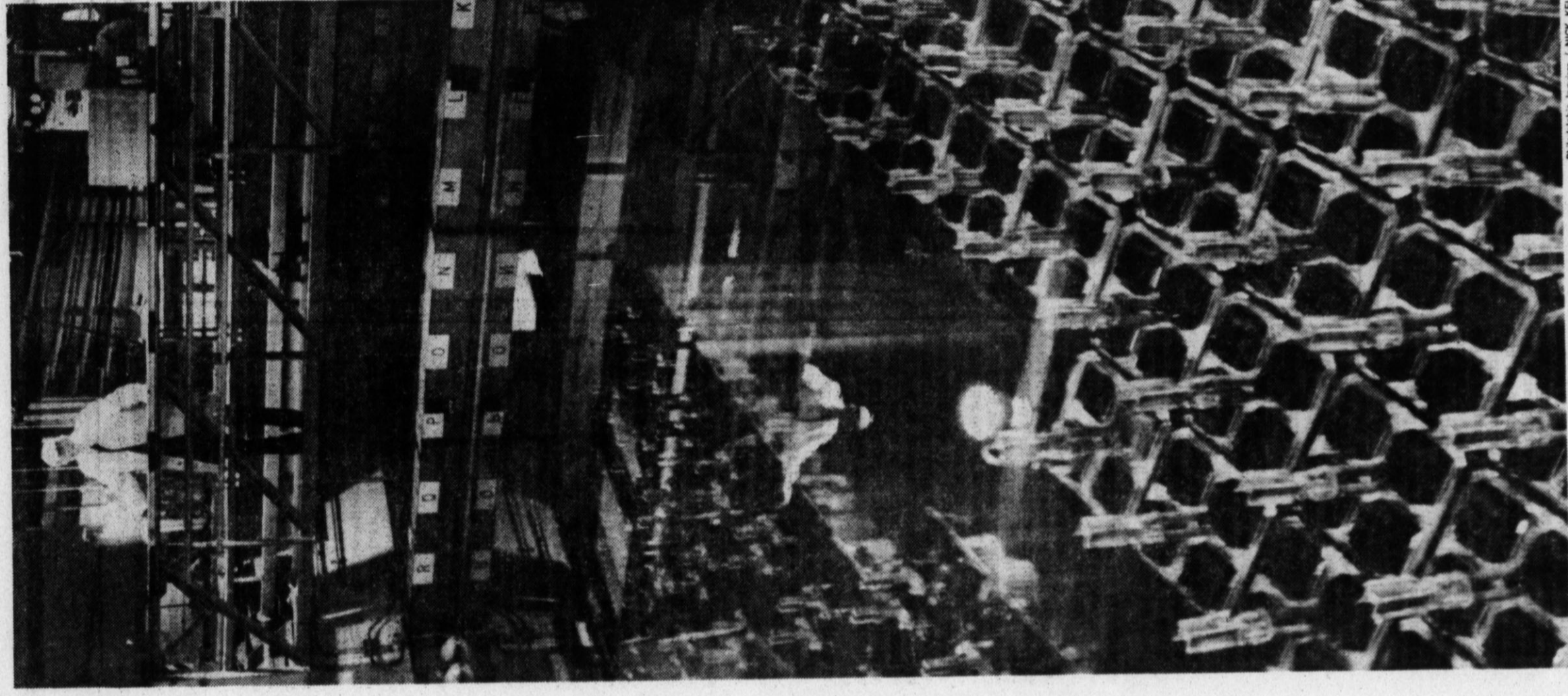
Plymouth, St. Lucie, Middlesex and York are among the 47 counties in 24 states that have nuclear plants where used fuel assemblies are stored. It now appears very likely that those deadly radioactive rods will stay right where they are long after the reactors have shut down.

The federal government, of course, publicly insists that this will not happen, that underground repositories will be built and the assemblies will be buried in them by the year 2000, just as Congress ordered last December in the Nuclear Waste Policy Act.

President Reagan spoke confidently in January when he signed the act into law, saying it provided long-overdue assurance that there was an effective solution to the nation's nuclear-waste problem.

Declared the President: "The step we are taking today should demonstrate to the public that the challenge of coping with nuclear waste can and will be met."

Indeed, federal officials are currently studying sites for repositories where tens of thousands of the lethal fuel assemblies would be stockpiled.



HUNDREDS OF USED FUEL ASSEMBLIES are stored in a pool at the never-opened reprocessing plant at Morris, Ill. Under the Nuclear Waste Policy Act, passed by the House and Senate in the waning days of their session in December 1982, the assemblies are someday to be shipped to a repository.

Department and the Interagency Review Group on Nuclear Waste Management all called for an expanded federal role in overseeing low-level waste burial. A 1977 report of the NRC put it bluntly:

"The undisciplined proliferation of low-level burial sites must be avoided."

But "undisciplined proliferation" is almost certain to occur if the compacts now under consideration become law.

In the Rocky Mountain compact, for example, a provision was inserted at the request of Nevada officials — who oversee the region's lone existing dump, at Beatty — that calls for another state to provide the regional burial ground within six years.

If approved, the Rocky Mountain compact would give Nevada authority to shut down the Beatty burial ground, possibly as soon as 1989.

states the same authority as regional compacts. Texas could pay a price for its independence.

As Tom Blackburn, director of special projects for the Texas authority, explained the dilemma:

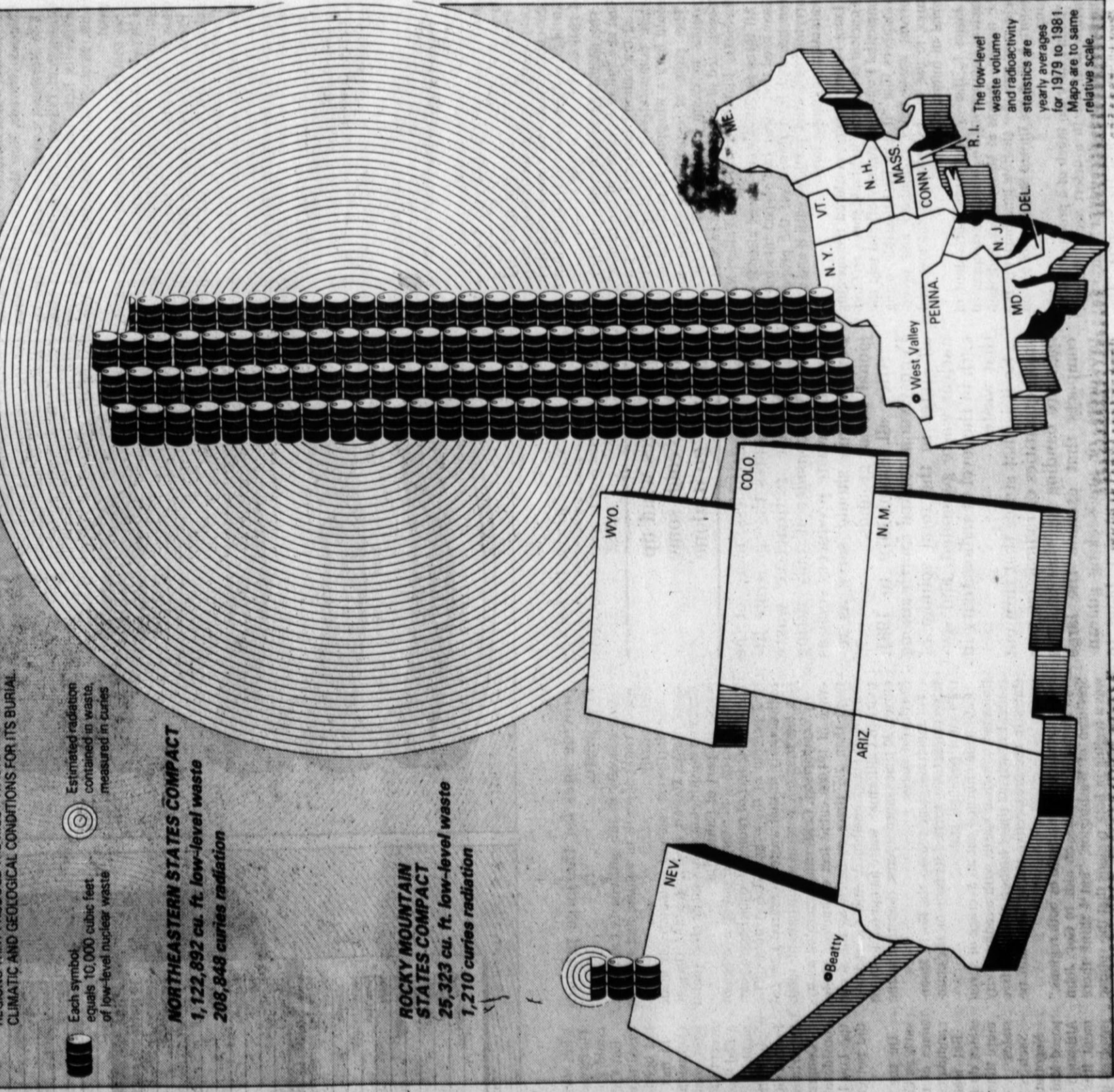
"We would hate to develop a site with the intention it was only for Texas and then have a higher court determine that was not legal and that we would have to accept out-of-state waste."

In any event, the outcome of the current political jockeying among the states to comply with the 1980 law could easily lead to a random, sharp increase in the number of low-level nuclear graveyards across the nation.

That is precisely what three federal studies in the late 1970s warned against. Reports by the Nuclear Regulatory Commission, the Energy

Congress' plan for low-level waste dumps

Relative amount produced



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That's because Illinois is centrally located, generates 52 percent of the low-level waste in the region and accounts for 39 percent of the radioactivity in the region's waste.

So far, the other nine states in the proposed region have been waiting for Illinois to "volunteer" to open a dump. Illinois has not done so.

One state official says that if Illinois is designated by the other compact members as the regional burial ground, the state may "go it alone."

Illinois' refusal to volunteer has made other states in the Midwest edgy, fearing that they might be chosen for the dump site. As a result, some are hedging their bets.

Wisconsin, for example, has carried on negotiations with states in both the proposed Midwest region, which stretches over the upper and central part of the country, and the Central Interstate region, which nine states in the nation's midsection are eligible to join.

By playing a waiting game, Wisconsin, which ranked 27th among all states in the volume of low-level waste produced from 1979 to 1981 and 17th in the level of radioactivity, hopes to be able to join whichever compact first selects a burial site.

"If it [a site] happens in the Central states," says Mark Musolf, Wisconsin's former secretary of revenue and member of the state's negotiating team, "we would look at it. That would offer some incentive for us to get in."

"If it happens in Illinois, that would look good for our involvement there. We are naturally hoping someone will come forward and be a host state volunteer. At least that will postpone the likely time we would have to deal with it."

Because of mounting fears about the political and financial liability of being a region's dump state, more and more states are considering "going it alone."

Maine, Kentucky, Illinois, Wisconsin, New York and Pennsylvania are among those that are considering establishing burial sites solely for waste generated within their borders.

The 1980 act, at least as written, did not anticipate that development. Although the law does not bar a state from going it alone, Congress' intent was to encourage a handful of burial grounds, each geographically situated to serve its region.

As the act itself states: "Low-level radioactive waste can be most safely and efficiently managed on a regional basis."

In addition, while going it alone has a certain political appeal, the idea may be fraught with problems. The 1980 act was so poorly drafted that it is not clear whether a state by itself can constitute a "region," and thus gain the power to exclude waste generated outside its borders.

Texas, which wants to open its own dump and avoid regional entanglements, has been wrestling with this ambiguity from the start.

Texas officials felt that their state, the nation's 15th-largest producer of low-level waste, generated sufficient volume to economically justify its own site.

In 1981, as the other states began their negotiations, the legislature in Austin passed a law establishing the Texas Low-Level Radioactive Waste Disposal Authority to build and operate a dump for waste generated only within the state. The authority already has awarded a contract for the "conceptual design" of a burial plot, but has not yet selected a site.

But if the 1980 act is found to deny

PART FIVE

Coming: A dump for your area

In the history of the nuclear era, Dec. 13, 1980, will go down as something of a milestone. It was on that date that Congress enacted the Low-Level Radioactive Waste Policy Act of 1980.

For years, Congress had struggled without success to come up with a master plan for managing the nation's growing output of low-level nuclear garbage.

From 1970 to 1980, the volume of such waste soared by 274 percent, from 883,000 cubic feet to 3.3 million cubic feet, while the federal government cast about for a way to handle it.

But on Dec. 13, the House and Senate, whose 535 members previously had been unable to strike any kind of consensus, reached a decision on how best to deal with the politically sensitive issue.

They turned full responsibility for it over to the states, thereby requiring about 7,000 lawmakers in 50 state legislatures to work out a

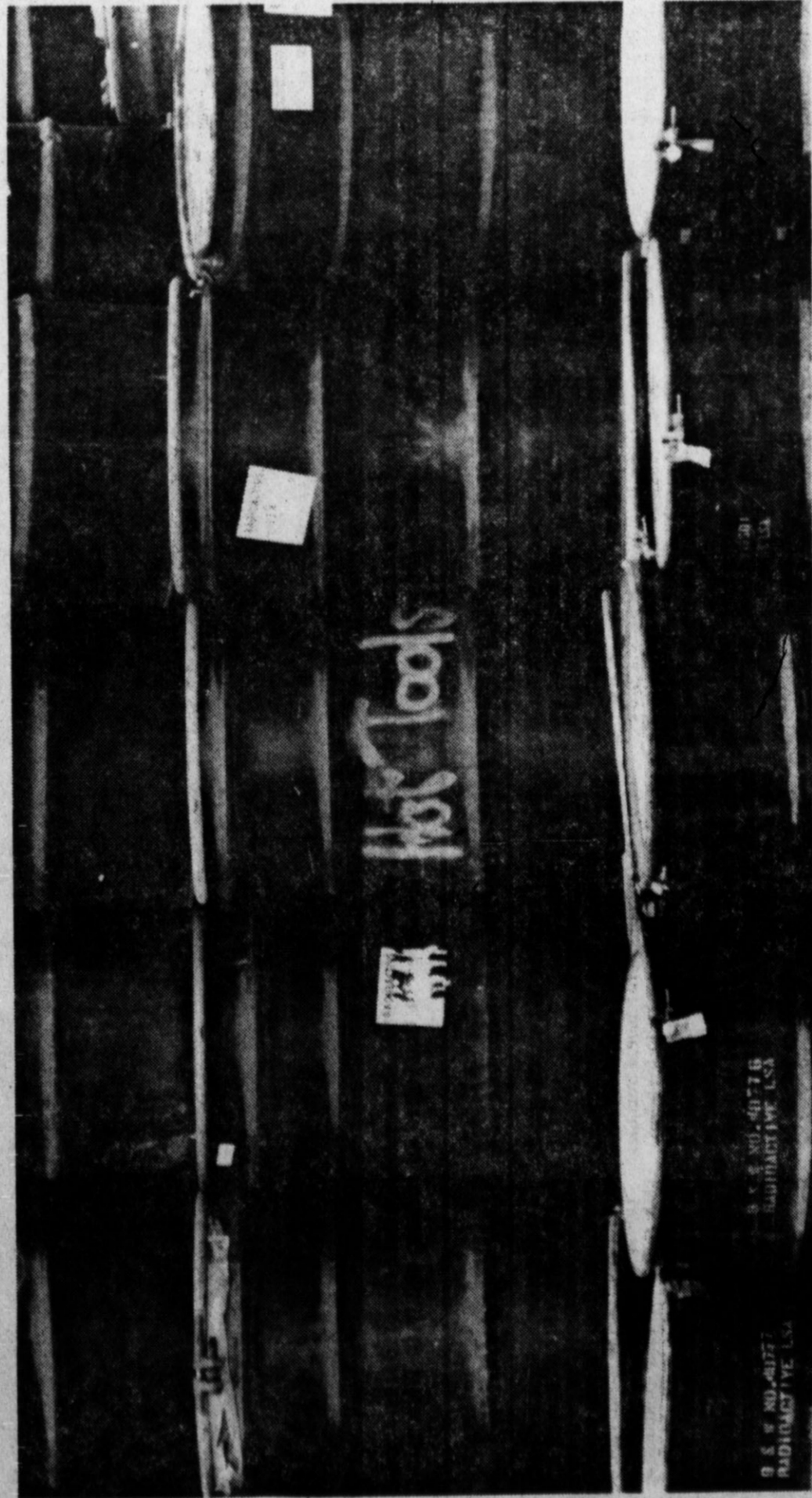
plan among themselves.

Sen. James A. McClure, an Idaho Republican and chairman of the Senate Energy and Natural Resources Committee, praised the efforts of his congressional colleagues.

"This is an effort to act now to take a first step in fashioning a solution to the nuclear waste problem which faces this nation," declared McClure, adding: "This bill should provide the opportunity... to make meaningful gains in managing the nation's low-level wastes."

In fact, what Congress enacted was a law that has touched off unprecedented political warfare, pitting state against state, region against region.

The law ordered the states to set up regional dump sites. Everywhere, states are scrambling to avoid being selected as the site for a dump and to shift the obligation to their neighbors.



Philadelphia Inquirer / NICK KELSH

Drums of nuclear waste await burial at Barnwell, S.C.; under a 1980 law, every part of the nation is supposed to receive such radioactive garbage

The conflict, which is just beginning to heat up, will become more bitter as the states struggle to meet a January 1986 deadline to comply with the law.

But more important than the warfare, the act will be repeated in the future. Middlemen known as "brokers" collect this waste from power plants, hospitals and other institutions that generate it. The brokers then truck it to one of the nation's three commercial burial grounds, in Beatty, Nev., Barnwell, S.C., and Richland, Wash.

As recently as 1975, there were six burial grounds. Three — in Illinois, Kentucky and New York

"Low-level waste" is the government's catch-

turning it over to the states and giving them only six years — until 1986 — to put together a comprehensive plan for nuclear waste.

There is little likelihood that the deadline will be met.

The very conflict that stalled Congress so long, the acrimonious politics of radioactive waste, now embroils 50 state legislatures and 50 governors' mansions.

That the Low-Level Radioactive Waste Policy Act is seriously, if not fatally, flawed only makes the politics more acrid than ever. The act holds every state responsible for the low-level waste it generates. A state may set up

Department projections, 203,000 assemblies will be awaiting burial.

At the Nevada Test Site, if the first assembly had been lowered into the ground when Jean of Arc was burned at the stake in 1431, and if crews had labored around the clock ever since, they would still be burying nuclear fuel assemblies.

Of course, federal energy officials insist that burial at a repository would proceed at a much faster clip than at the experimental Nevada project, and that several repositories will be scattered about the United States.

They estimate that one fuel assembly will be lowered down the 2,000-foot shaft to a repository every hour of the day.

But a commercial-scale burial operation has never been tested — and will not be tested prior to the design of the repository. In short, no one knows how a production-line burial system would function.

Even Congress' own advisory panel, the Office of Technology Assessment, created to pinpoint the consequences of technological programs for lawmakers, has warned of the folly of building a repository without testing the burial process.

"It is almost imperative to obtain some hands-on experience at a pilot scale before attempting to design and construct a full-scale facility," Thomas A. Cotton, director of the Office of Technology Assessment, told a congressional committee in 1981.

"It would be awkward at best," Cotton said, "to build a repository and discover that in practice it can only be loaded at half the design rate — after it is too late to change it."

It would be even more awkward to build a repository, load it with thousands of tons of lethal radioactive waste, and discover, belatedly, that it leaked in, say, 10 years rather than the 10,000 promised by government. That could create a health and environmental disaster without precedent.

For the truth is, although the federal government is awash in paper studies on repositories, no one has the slightest idea what will happen when the largest concentration of deadly waste in history is dumped in a single location deep underground.

A prestigious French scientific study commission, in a report made public in December, said the uncertainties were so great that plans for permanent burial of nuclear waste should be deferred — a recommendation that ran directly counter to a recommended opinion in both France and the United States.

"In the current state of knowledge," the commission said, "all the used-fuel management strategies present uncertainties for the safety of long-term waste storage."

"As long as the... uncertainties have not been dispelled, nothing irreversible should be done in terms of waste management."

On top of all the unanswered technical questions, the 40-year record of nuclear-waste management by the U.S. government and industry, a record studded with faulty engineering, flawed scientific projections and failed technologies — offers little cause for optimism about projections concerning fuel-rod burial, a complex and hazardous operation.

After only 20 years, the failure rate for commercial low-level waste burial grounds stands at 50 percent.

And the waste in those dumps amounts to just 7 million curies — about six hundredths of 1 percent of the 11.1 billion curies in used fuel rods awaiting burial.

How utilities were left to juggle fuel rods like 'balls in the air'

How did the United States get into this predicament?

During the 1950s, the Atomic Energy Commission (AEC)

adroitly courted electric utilities to build nuclear power plants. As the utilities succumbed, one by one, to the gentle persuasion of federal incentives, one promised subsidy stood out above all the others:

The federal government said that it would assume full responsibility for used fuel rods.

This was an unprecedented commitment. The government did not accept mountains of ashes from coal-burning power plants, or for that matter, the waste products of any other industry.

That promise was critical to the birth of nuclear power, for it relieved the utilities of a nagging problem: what to do with the deadly radioactive fuel assemblies that each plant in time would discard by the tens of thousands.

An assembly in a conventional nuclear reactor is a metal container that encloses a bundle of individual fuel rods, numbering from 63 to 264 depending upon the type and design of the reactor.

Originally, plans called for the used fuel assemblies to be stored temporarily at reactor sites. Because of their intense heat and radioactivity, they had to be kept under water in 40-foot-deep, steel-lined pools built of concrete several feet thick.

After a few years in the pools, during which time the heat and radioactivity levels would fall off sharply — although the assemblies would still remain lethal for centuries — they were to be shipped to either government or private plants for reprocessing.

So it was that when today's operating nuclear plants were constructed, the utilities, relying on the government's pledge, designed the storage basins to hold only several years' worth of assemblies.

The rest is history. The government reneged on its promise. No private reprocessing industry developed. Utilities were compelled to continue storing the assemblies in their pools.

And thus the current impasse. As the storage basins gradually filled, the power companies were left with two options: short of shutting down their expensive plants, through a process called re-racking.

• Or transfer the assemblies to pools in newer plants with more space.

More than two-thirds of the nation's power plants already have re-racked their pools at least once, bunching the assemblies closer together, according to the Nuclear Regulatory Commission.

There is, though, a practical limit to the number of assemblies that can be jammed together. In addition, some pools cannot be expanded because of seismic conditions. Others are limited by weight restrictions.

A single assembly from one type of reactor in use weighs about 1,400 pounds. At some plants, 50 assemblies may be removed from a reactor during refueling, adding upwards of 70,000 pounds to a pool.

Finally, there is an element of danger. Although it is considered a remote possibility, theoretically, if a re-racked pool suddenly lost its cooling power, the heat could build up quickly and cause an explosion, sending a cloud of radioactive debris into the air and depositing it about the countryside.

It was for safety and other reasons, including a fear that power plants would be turned into high-level waste repositories — a fear that may prove well-founded — that some states sought to block expanded storage in reactor pools.

The Minnesota Pollution Control Agency was one of the first to raise the issue back in 1977, when it unsuccessfully challenged plans by Northern States Power Co. to re-rack the pool at its Prairie Island generating station.

Minnesota believed that the utility should pursue other storage options before enlarging its pool capacity. Explained John W. Fereman, an official of the Minnesota Pollution Control Agency: "We're not opposed to the re-racking of the pool, but we're opposed to the re-racking of the pool."

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and varied quantities of nuclear waste existing today in the United States and nuclear wastes which will be created in the years and decades ahead.

The optimistic rhetoric aside, the manner in which the bill was passed says much about what may be expected from it, as well as Congress' attitude toward the nation's most technologically complex and potentially lethal industrial-waste problem.

By early December last year, the House and Senate had approved separate versions of nuclear-waste bills that differed dramatically. Normally, such conflicting bills are sent to a conference committee made up of members from both houses to work out a compromise.

In the case of the nuclear-waste legislation, the differences were so great, and the time was so short, that it was widely believed no bill would be acted upon — just as had happened in December 1980, when the House and Senate reached a deadlock on the issue.

Instead, two lawmakers, Sen. McClure and Rep. Morris K. Udall (D., Ariz.), and their committee staffs put together a final bill which was rushed through a lame-duck session of Congress in 90 minutes, hours before the start of the Christmas vacation.

During the afternoon of Dec. 20, the Senate, with many of its members absent and with debate limited to a total of 15 minutes, approved 17 unprinted amendments to the bill.

Some of the amendments were lengthy and to the uninformed, obscure, prompting one congressman to observe later that "there is not one senator who could tell us what is in this bill."

The Senate forwarded the revised legislation to the House with orders to pass it or defeat it without further change — or, as a disgruntled representative put it, to "take it or leave it."

The House took it. With one-third of its members not bothering to vote and the other two-thirds unfamiliar with the Senate's amendments, the House rubber-stamped a 30,000-word bill that contained provisions it had previously rejected as unsound.

As might have been expected when Congress enacts a law that few of its members understand, the bill resembled a legislative Christmas tree, festooned with favors for special interest groups and influential politicians.

It also was laced with provisions that ran contrary to the often-stated intentions of the people who passed it. And it called for the implementation of conflicting waste programs.

But the bottom line of the Nuclear Waste Policy Act of 1982 is this:

At best, it will be left to a future generation to devise a safe and effective system for managing high-level radioactive waste.

At worst, any repository that is built to store used nuclear fuel rods will be placed not in the safest area, but in the area whose lawmakers exercise the least political muscle.

Over the last two decades, the federal government has spent hundreds of millions of taxpayers' dollars looking for someplace to store high-level radioactive waste.

Scientists have scoured the nation in search of favorable geological formations in areas that have little earthquake activity and are located far from large population centers.

Based on these studies, federal energy planners and the Battelle Memorial Institute of Columbus, Ohio, the contractor overseeing the project, have come up with a list of eight prospective sites in six states — Louisiana, Mississippi, Nevada, Texas, Utah and Washington.

Interestingly, of the six states, not one has any nuclear fuel assemblies in storage. Two, Nevada and Utah, do not have any nuclear plants in operation or even planned.

Mississippi and Texas each have four nuclear power units either partially built or ready to start up. Louisiana and Washington each have three.

While the search for a piece of land for the first repository is centered west of the Mississippi River, most of the used nuclear fuel

Congress tackles the problem with a hastily approved act

It was against this background — some utilities shipping fuel assemblies from one plant to another, most just jamming more assemblies into existing pools — that Congress enacted the Nuclear Waste Policy Act of 1982.

Overall, the act is a case study in how the federal government has done wrong in 40 years of unsuccessful efforts to manage radioactive waste, all rolled into a single piece of legislation.

Its supporters in Congress, Democrats and Republicans alike, view it a bit differently, as evidenced in the speeches of those who urged its passage.

Said Rep. Carlos J. Moorhead (R., Calif.): "We have a good bill, one that will adopt a permanent policy for this country and one which I think will work."

Said Sen. James A. McClure (R., Idaho): "This bill is a truly comprehensive approach to the ultimate solution to disposition of the large

PHOTO BY NICK KELSH FOR PHILADELPHIA INQUIRER

PHOTO BY NICK KELSH FOR PHILADELPHIA INQUIRER

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assemblies are at power plants east of the Mississippi. Of the 35,686 assemblies in utility or reprocessing-plant storage pools, 4,209, or 12 percent, are in five states west of the Mississippi — California, Iowa, Minnesota, Nebraska and Oregon.

Of the remaining 31,477 assemblies stored east of the Mississippi, 19,739, or 55 percent of the overall total, are in just six states — Alabama, Connecticut, Illinois, New York, North Carolina and Pennsylvania.

This means that if the assemblies are shipped to a repository by truck, the nation's highways will be turned into nuclear thoroughfares, with fuel-laden tract or-trailers leaving power plant gates hourly.

It is possible, of course, that the assemblies could be transported by train rather than truck, although many nuclear plants are not near existing rail lines.

An atomic rail system also would require marshaling yards where individual cars would wait with their radioactive cargo while an entire train of fuel-rod carriers could be as-

sembled.

That would turn rail depots, most of which now are in heavily populated areas, into temporary storage sites for high-level radioactive waste.

But all those possibilities are decades away, if they are to happen at all. In the meantime, how goes the search for a repository site in the six states tapped as finalists?

In Mississippi, two salt domes were designated as worthy of more detailed study, with the prime contender a formation near Richton, about 20 miles east of Hattiesburg.

Sen. John C. Stennis of Mississippi, a Democratic power in his 38th year in the Senate and chairman of its Armed Services Committee, took special note of the preliminary tests undertaken at Richton during debate on the Nuclear Waste Policy Act last year.

Responding to the pleas of constituents, who were reacting to published reports that the Richton salt dome was "number one" among possible sites, Stennis said he had conducted a personal inspection tour. Declared the senator: "My investigation led me to question: the

Department of Energy's rationale for going into an established community like Richton, Miss., and tell the people that there was nothing to be afraid of, there was nothing to fear. That this was only a test, and if the Department of Energy were allowed to continue the work, everybody in the town would get rich.

"Or, as some said, 'It would be equivalent to the second coming.'"

Suggesting that the technology for safe storage of high-level radioactive waste was still unproven, Stennis told his colleagues: "It seems incredible to me that the work in Mississippi has progressed to the point it has. With the number of possibilities that exist in barren, uninhabited areas and with the number of possibilities in areas which have long been established as communities of nuclear workers, scientists and technicians, that we would create by legislating a program which would allow the further exploration of large, populated areas before we have adequately demonstrated that we indeed have the know-how to safely dispose of this waste."

The Nuclear Waste Policy Act subsequently passed by Congress directed the secretary of energy to prepare guidelines to be used in recommending a location for the construction of a repository.

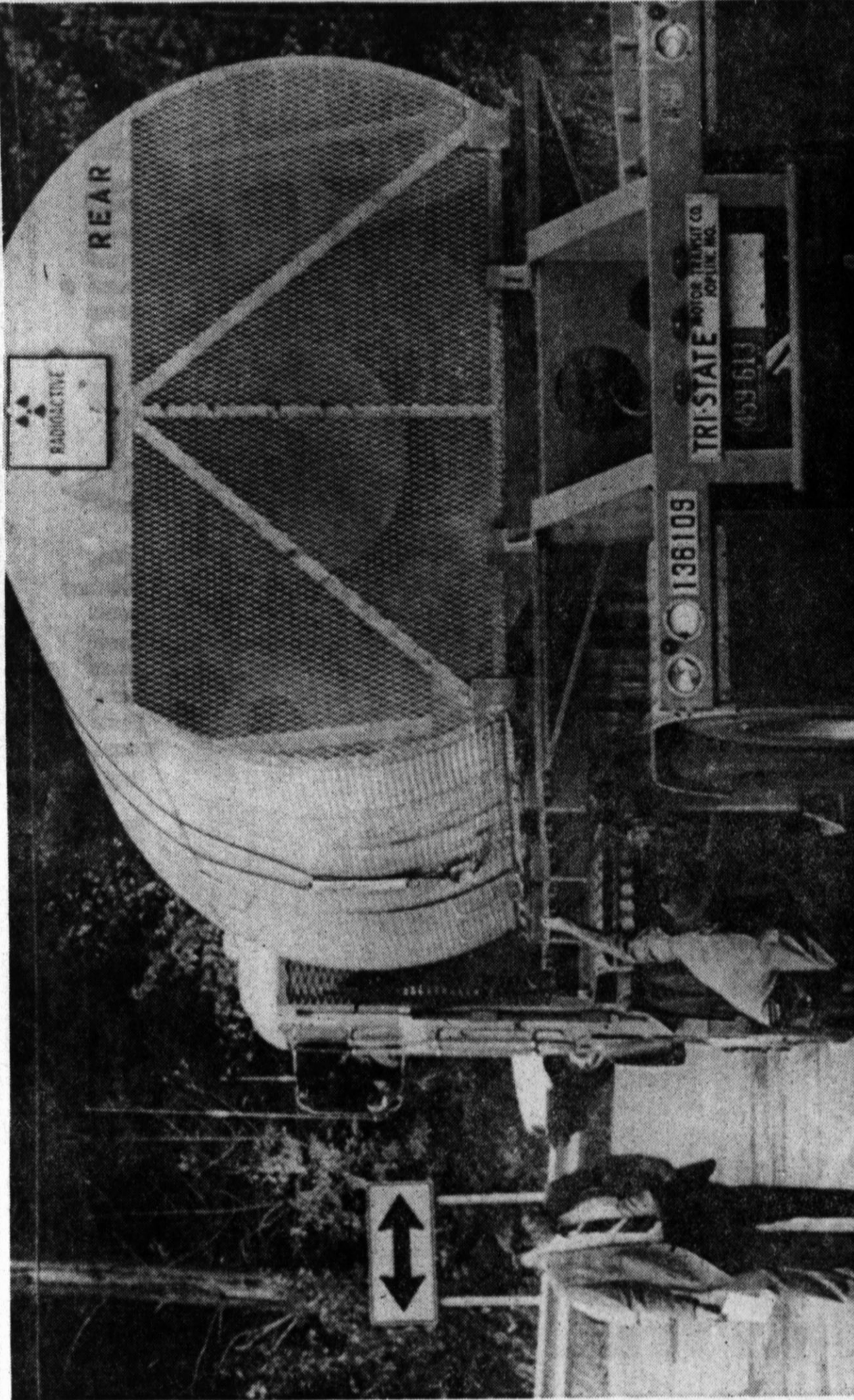
Those guidelines, according to the law, must disqualify from consideration any potential site situated "adjacent to an area one mile by one mile having a population of not less than 1,000 individuals."

Conveniently, 1,200 people live in a one-square-mile area in Richton. One of them is Sen. Stennis' sister.

If any members of Congress thought that the 1,000-people-per-square-mile limitation smacked of parochialism, another Mississippiian — Rep. Trent Lott, a Republican — had advice for them. Remember, he said, that "this square-mile area could be a section of the city of Cleveland, Ohio, or a town within the state of Mississippi."

That prompted David D. Marriot, a Republican congressman from Utah, to observe that the Energy Department had promised that no favoritism would be shown in site selection.

Nuclear Waste in America



INSPECTORS CHECK A TRUCK loaded with used fuel assemblies from the defunct reprocessing plant at West Valley, N.Y. Under a federal court order

obtained by New York State, the assemblies were removed from storage at West Valley and shipped in October to an electric utility in Wisconsin.

... are seeking permission to increase the number in their storage pools

man said, "would not be able to raise this in an individual reactor licensing hearing."

The lone member of the NRC who dissented from the rule, Victor Gilinsky, said that each power plant ought to be studied to determine whether used fuel assemblies could be stored there safely for an indefinite period.

The rule, Gilinsky added, "puts off addressing the practical aspects of this problem for many years, and in some cases, decades."

For their part, the electric utilities, confronted once again with the strong possibility that the federal government will fail to build the promised repository, are laying their own plans.

Some utilities will make use of a process called re-racking, in which the used fuel assemblies are squeezed closer together. That will enable them to jam 40 years' worth of assemblies into a pool built to hold only several years' used fuel rods.

For other utilities, re-racking alone will not provide sufficient additional space. They are looking at two other options: rod consolidation and dry cask storage.

In re-racking, entire fuel assemblies are moved closer together in the pool. Rod consolidation is a condensed form of re-racking in which the individual fuel rods are bunched closer together.

Maine Yankee Atomic Power Co., the first utility seeking to go this route, has had a rod

consolidation request pending with the NRC for several years. The State of Maine opposes the plan, contending that the additional fuel rods would increase radioactive contamination in an accident.

The worst-case accident scenario is tied to a loss of cooling power in the storage pool. In such a case, heat would build up quickly, melt the rods holding the uranium fuel pellets, and release hydrogen. The hydrogen would explode, rip open the building enclosing the pool, and shower the surrounding countryside with radioactive debris.

Both the U.S. Department of Energy and the utility industry reject this possibility, although it was a failure in the reactor's cooling system at Three Mile Island in Pennsylvania in 1979 that led to the worst commercial nuclear accident in history.

At present, the storage pool at Maine Yankee's Wiscasset power plant is three-fifths full. The pool is licensed to hold a maximum of 963 assemblies; unless storage capacity is enlarged, the plant will be forced to close in 1987.

Re-racking alone, a Maine Yankee spokesman said, would increase the storage capacity to about 1,500 assemblies, and rod consolidation would boost it to 2,400.

That would provide enough space, the utility spokesman said, to "take us just about to the end of the plant life, which is 2008."

nology, would work like this, according to a utility representative:

The core of the Maine Yankee reactor holds 217 fuel assemblies. Each assembly, in turn, contains 176 individual fuel rods. About one-third of the assemblies are removed from the core each year and replaced with fresh fuel.

To consolidate the rods, the top would be lifted off each assembly, a metal box about 8 inches square and 12 feet long. Rods would be removed one by one and inserted in a new metal casing the same size as the assembly, only closer together.

Although the technology has yet to be approved by the NRC, the Maine Yankee spokesman pointed out that "the actual process of doing it, taking individual rods out of a fuel assembly and putting new ones in, has been done many times."

"We've done it in our own pool," he said. "For instance, we have a fuel assembly that's got a leaking rod, let's say. We pull that one out, slip a new one in its place. So the procedure for doing it is down pretty pat. It's been done for different reasons."

A single fuel assembly may weigh more than 1,400 pounds. Because of weight limitations on pools, some utilities will be restricted on the number that can be stored.

Those utilities are expected to use dry cask storage, which involves placing the assemblies in a steel-and-lead cylinder, a sort of nuclear coffin.

A cask, measuring 8 feet in diameter and 16 feet in length, will hold as many as 52 assemblies — considerably more if the rods are consolidated first. The cask would be stored in a building on the power plant property.

Through re-racking, rod consolidation, dry cask storage or some combination of the three, most utilities will be able to store all the assemblies their reactors will spew out during their operating lives.

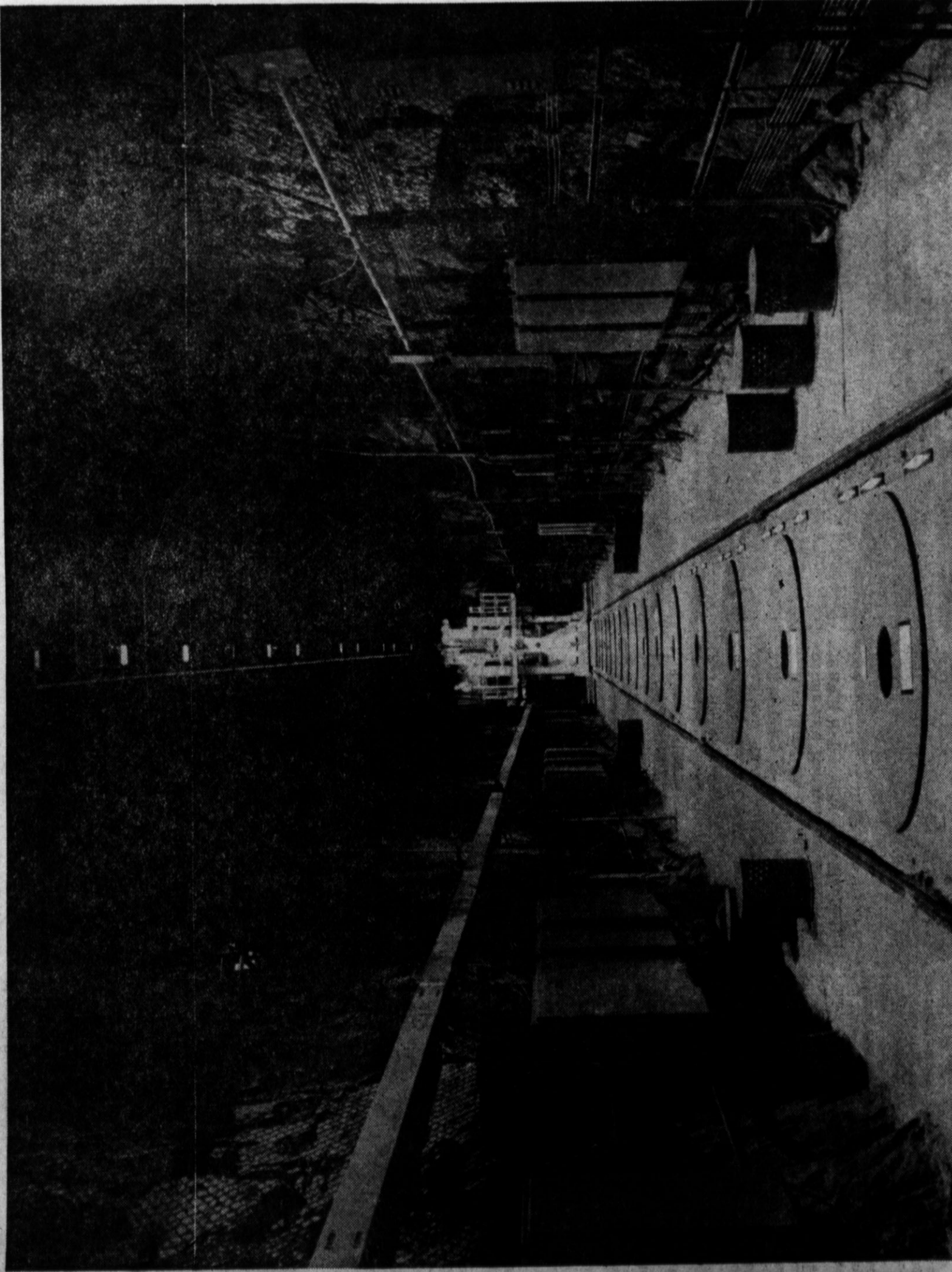
Philadelphia Electric Co. is among the utilities that, through re-racking and rod consolidation, expects to be able to store on-site all the fuel rods the plant will produce into the 21st century.

Clifford H. Brenner, PE's vice president for corporate communications, said that re-racking would meet the York County plant's storage requirements through 1990.

"However, we have not done any rod consolidation, and that will increase storage capacity," he said. "Even on the low side, it would double capacity... so we don't see any problem for the life of the license."

Peach Bottom, therefore, should be able to accommodate all used fuel rods from reactor operations at least until 2008, when the existing Nuclear Regulatory Commission license expires.

Peach Bottom — with 2,382 fuel assemblies in storage — ranks third in the nation in the number of assemblies in its ponds.



AS A TEST, the government buried 11 used fuel assemblies in shafts like this one, 1,400 feet underground at the Nevada Test Site. An Energy Department spokesman said the assemblies measured 13 feet long by 15 inches square; each weighed over half a ton. It took more than a day to bury each one.

U.S. Department of Energy

FOREVERMORE.

To solve the nuclear-waste dilemma, the EPA says it is highly unlikely that any of the RSPF concepts will prove to be an acceptable ultimate disposal technique for this waste.

The likeliest solution The government will do nothing

Here, then, is a capsule summary of Congress' master plan to deal with high-level radioactive waste:

The government will select sites to build two or more repositories where the used nuclear fuel assemblies will be buried permanently. The repositories will not be built in states with sufficient political influence to kill them.

While the government prepares plans to build the repositories, it also will construct away-from-reactor facilities to store the assemblies temporarily, although there will be no need for such facilities if the government really builds repositories.

Simultaneously, the government will prepare plans to build monitored retrievable storage facilities from which the assemblies may be removed. But the most likely reason for removing the assemblies would be to reprocess them and recover the plutonium for military weapons, which federal law now prohibits.

And finally, the government says it will allow utilities to ship their used fuel assemblies to temporary storage facilities only after they have exhausted all potential storage options on plant grounds. But most utilities have enough options for on-site storage that they would never need to ship assemblies to a temporary storage facility.

With no place to send their used fuel stacks up

At the reactors, used fuel stacks up

Since the birth of atomic power, the U.S. government has had a schizophrenic policy on radioactive waste. While federal agencies announce that a particular waste-management program will be followed, they prepare other plans on the assumption that it will be scrapped. As a result, seldom have announced policies been implemented.

Nothing better illustrates this than the Nuclear Regulatory Commission's proposed regulation that would allow electric utilities to store used fuel assemblies for more than a half-century at reactor sites. The commission says it has determined that "there is reasonable assurance that one or more mined geologic repositories for commercial high-level radioactive waste and spent fuel will be available by the years 2007-2009."

But just in case there is no repository, the

ating station. Even the Shippingport, Pa., reactor that shut down in October 1982, and which the Energy Department plans to dismantle over the next several years, is less than 1/15 the size of today's commercial reactors.

Not too surprisingly, then, the nuclear industry has hinted on occasion that it might be better hauled to seal off reactor buildings in effect, to entomb them. An official of the Atomic Industrial Forum, the nuclear-industry trade association, once explained to a House Science and Technology subcommittee that "because of costs, occupational radiation exposure and environmental considerations," it would be best to delay dismantling.

A power plant is allowed to sit for a century or so, radiation levels would fall off sharply, making the job easier and cheaper. While utilities presumably would have to continue to pay whatever expenses were involved in monitoring an entombed reactor, to guard against accidental radiation exposure to the public, the taxpayer might eventually pick up part of the tab.

And that brings us to why it may be beneficial for utilities to allow fuel assemblies to remain at power plants for the next 50 to 100 years: another provision of the Nuclear Waste Policy Act of 1982.

A special-interest clause in the act ultimately will free the utilities of any obligation to take care of the used fuel assemblies accumulating in their storage pools.

For the first time, the utility industry agreed to underwrite the cost of developing storage facilities, an expense that previously had been borne by the government.

The act established a nuclear-waste fund financed through fees paid by individual utilities based on the amount of electricity they generate with nuclear power.

The levy, pegged at one mill per kilowatt hour of nuclear electricity, will raise about \$300 million this year. According to industry projections, the figure will increase gradually to about \$600 million annually.

By the turn of the century, it is expected that utilities will have contributed more than \$7 billion to the federal fund, with homeowners kicking in about \$2.5 billion of that amount and business customers the rest.

All these billions will go to finance the final later this year or early next year unless challenged in court, grows out of two law suits brought in the late 1970s as used fuel assemblies began to clog utility storage pools.

Both legal actions were filed to keep utilities from expanding the storage capacity of their pools. One suit involved the Prairie Island nuclear plant in Goodhue County, Minn., and the other involved the Vermont Yankee nuclear plant in Windham County, Vt.

federal energy bureaucracy's quest to find suitable sites and build storage facilities — whether permanent repositories or monitored retrievable storage centers.

But what happens in the year 2000 if no repository or storage center has been built? What happens if the federal government has frittered away billions of ratepayers' dollars and has nothing to show for it, just as it has done with billions of taxpayers' dollars for the last three decades?

Perhaps foreseeing this eventuality, the utilities insisted on a provision in the waste policy act that will take care of it. In exchange for payments to the nuclear-waste fund, the act provides that the secretary of energy will "dispose of high-level radioactive waste or spent nuclear fuel" beginning no later than Jan. 1, 1998.

As is the case with so many sections of the law, this one is open to varying interpretations. If no storage, either temporary or permanent, is available in 1998, how is the federal government to "dispose" of the used fuel assemblies?

The most plausible answer is they will stay exactly where they are, in reactor storage pools — but under new ownership.

"They [the utilities] may be able to cook up a deal where they turn it over and leave it right on site," says Russell Stanford, a nuclear-waste specialist with the Edison Electric Institute, the electric-utility trade association.

In fact, it seems quite likely that the government will be obliged to do just that, for there appears to be little chance, given progress to date, that a repository or a monitored retrievable storage center will open in this century.

While lawmakers did not foresee this possibility, Andrea Dravo, a member of the House Interior and Insular Affairs subcommittee staff that helped to draft the legislation, acknowledged that "there is that kind of ambiguity in the statute."

"I suppose there would be an enormous fight about it," she said, "but there hasn't been any interpretation of the language to that extent. So it is that the final legacy of the Nuclear Waste Policy Act of 1982 may well be this: Come the year 2000, a new generation of American taxpayers will pay rent to the Philadelphia Electric Co., Commonwealth Edison Co. and other nuclear utilities to continue to store used fuel assemblies at their reactors.

Federal energy officials and others, Marriott said, had indicated "that every site will be evaluated fairly and evenly, that there is no hanky-panky going on, that no deals have been cut underneath the table, and that every site will be looked upon and we will then evaluate them based upon the criteria."

Marriott had more than a passing interest in the criteria for evaluating sites. Another of the eight under study by the Energy Department was the Gibson salt dome in eastern Utah, situated between Moab and Monticello and bordering the Canyonlands National Park.

Fortunately, the Nuclear Waste Policy Act also had a special provision seemingly aimed at discouraging a nuclear-waste repository in that location.

The act directed the energy secretary, in drafting his guidelines, to consider a potential site's "proximity to components of the National Park System."

The key word in Rep. Marriott's defense of the selection process was "evaluate." While all sites might be evaluated fairly and evenly, some, such as the Richton salt dome, will not be chosen because of special deals worked out with Congress or federal agencies.

For example, take another of the eight potential repository locations: the Vacherie salt dome about 40 miles southeast of Shreveport, La.

Tests were conducted at the Vacherie dome just as they were at Richton. But even if the Vacherie dome is deemed the safest place in the United States to store high-level radioactive waste, no repository will be built there.

That's because five years ago, Louisiana reached a private understanding with the Energy Department in which the federal government promised it would not store nuclear waste anywhere in Louisiana if the state objected.

The agreement, concluded early in 1978, was little noticed at the time because it was part of a pact dealing with the nation's Strategic Petroleum Reserve.

Authorized by Congress in 1975 following the Arab oil embargo, the petroleum-reserve project called for the eventual storage of one billion barrels of crude oil largely in Louisiana salt domes.

In exchange for allowing the salt caverns to be used as America's crude-oil storage reserve, Louisiana officials extracted a guarantee from the Energy Department that the state would have final say on any nuclear-waste storage facility.

In February 1978, Edwin W. Edwards, then the Democratic governor of Louisiana, and John O'Leary, deputy secretary in the Energy Department, signed a three-page "principles of understanding."

led. The amended agreement stated flatly: "The Department of Energy will not construct any nuclear waste repository in Louisiana if the state objects."

Four sites down, four to go — but no state wants the repository

To date then, the federal government has made this much progress in choosing one of the eight potential sites for the country's first high-level radioactive garbage dump:

The Richton salt dome in Mississippi will not be selected because of a special deal worked out with Congress and incorporated in the Nuclear Waste Policy Act.

The Vacherie salt dome in Louisiana will not be selected because of a special deal worked out between the state and the Energy Department.

The Gibson salt dome in Utah almost certainly will not be selected because guidelines inserted in the Nuclear Waste Policy Act disqualify it.

In addition, the Cypress salt dome in Mississippi most likely will not be selected because it is rated less desirable for technical reasons. Although any of these four locations could be nominated as one of the five final candidates, it is unlikely that any will be selected for the repository.

That leaves four locations from which to choose. Those sites, and the current status of each, are:

Richland, Wash. — Exploratory drilling is scheduled on the federal government's sprawling Hanford Reservation near Richland to test the suitability of a basalt rock formation.

Residents in the immediate area are staunchly pro-nuclear. Bomb-grade plutonium is produced at Hanford, and one-third of all defense high-level radioactive waste is stored there.

They want the repository. The rest of the state opposes it.

Three years ago, the state's voters overwhelmingly approved an initiative banning the further burial of low-level, non-medical nuclear waste from out-of-state at the commercial burial ground near Richland.

(Nuclear supporters, utilities and the federal government challenged the initiative in federal court. The court ruled the ban unconstitutional because it imposed improper restraints on interstate commerce and interfered in a field regulated by the federal government.)

ing-water supplies. There is also concern about the suitability of the basalt formation. A National Academy of Sciences panel said that certain types of waste "would probably melt the adjacent rock materials."

"Quite possibly the melting would not be sufficient to impair the integrity of the disposal site," the panel added, "but this kind of occurrence is not contemplated in current designs for bedrock repositories and would need additional study."

These concerns notwithstanding, some nuclear-waste observers believe that the history of the Hanford Reservation could lead to its selection for the first repository. Their reasoning goes like this:

Because of radioactive-waste handling mistakes dating from the 1940s, and the large volume of defense waste already in storage, among the most contaminated pieces of real estate on earth.

Since this property probably will never be cleaned up — and therefore must be isolated from mankind forever — it is logical to place a repository there, even if the geology is not especially favorable.

Completed at the Nevada Test Site, about 65 miles northwest of Las Vegas, on the suitability of a tuff rock formation.

As is the case in Washington, many residents in the Beatty area favor construction of a repository at the 1,350-square-mile test site, while most of the rest of Nevada opposes it.

Also like Washington, Nevada is seeking to restrict usage of a commercial, low-level radioactive-waste burial ground at Beatty.

That opposition to radioactive garbage dumps is bipartisan is reflected in the Beatty site. The legal proceedings were initiated under Gov. Robert List, a Republican, and are continuing under Gov. Richard Bryan, a Democrat.

A spokesman for Gov. Bryan summed up the opposition of many residents this way: "The state's general attitude is Nevada's the dump site for everything that everybody else doesn't want, and it's a very kind of Western attitude, of we don't want to be the dump site for everything. . . . It's a blanket hostility."

Nevada's new governor has staked out an equally tough position toward a high-level waste repository.

"I am 100 percent against this continuing attempt to make Nevada a dump site for the nation's unwanted programs," Bryan said. "We will take advantage of all available avenues to see that this controversial program does not come within our borders."

Nuclear Waste in America

According to a spokeswoman for the Office of Nuclear Waste Isolation — a unit of the Battelle Memorial Institute, which has a federal contract to coordinate the search for a repository site — 10 bore holes have been drilled in the two Texas counties.

The purpose of the bore holes, she explained, is "to obtain geologic and hydrologic information at various depths" and "to get a pattern of the geology, the strata of the rocks underneath, and of the flow of the ground water."

She added that seismic measuring lines and "a micro-earthquake detection network" had also been installed.

Of the eight potential repository sites, Tulsa and Hereford provoked the least opposition last year during congressional debate, both on state and national political levels.

Part of the reason may be geography. Both counties are about 350 miles from the nearest major metropolitan center, Dallas, and both have low population densities.

With 9,700 residents, Swisher County averages 11 people per square mile. With 21,200 residents, Deaf Smith County averages 14 people per square mile.

In any event, of the congressional delegations from the six potential repository states, the Texas contingent expressed the least concern during debate on the waste policy act last year.

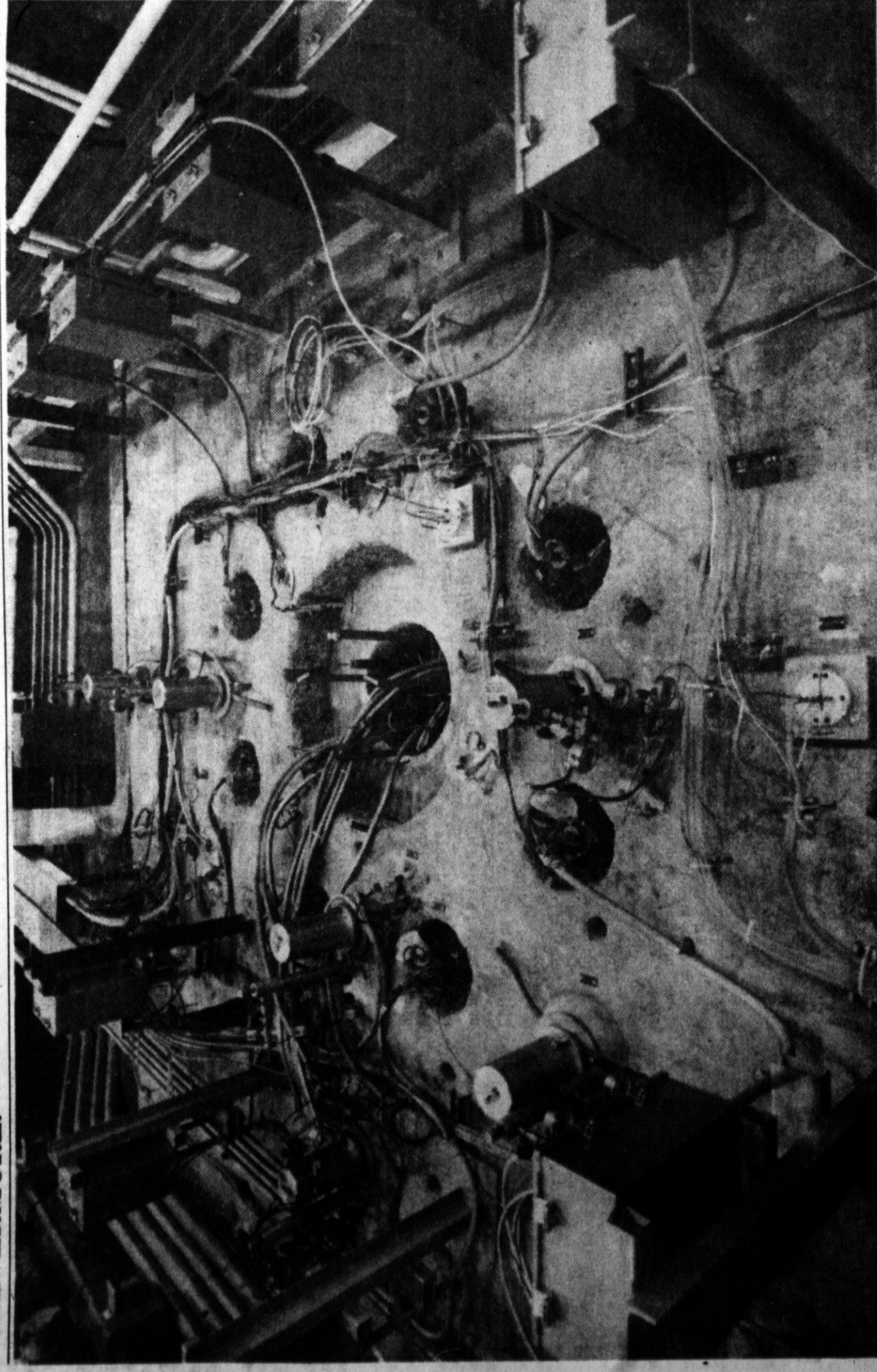
All that changed earlier this year when the Energy Department formally advised Texas officials that their state had been selected as one of the candidates.

Residents of Swisher and Deaf Smith Counties rallied against the project, charging that the radioactive waste could lead to contamination of the Ogallala aquifer, which supplies water for drinking and irrigation of the rich farm lands in the two counties.

As political opposition mounted, state legislators demanded that Congress bar the Energy Department from giving further consideration to Texas as a repository site.

Although Texas missed its chance to secure a special exemption in the waste policy act, as more vigilant states did, it may not be lost. The act offers another escape mechanism for any state that does not want to be the home of the world's largest and deadliest radioactive garbage dump.

FOREVERMORE,



DEEP IN A MOUNTAIN on the Hanford Reservation in Washington state, the government is testing the suitability of basalt for the storage of used nuclear fuel. Here, testing instruments are sent down a center shaft in the storage area. No fuel assemblies are being buried in the Hanford test.

For repository No. 2, the East is a target — including Pennsylvania

Although one repository has so far proved impossible to construct after nearly 30 years of planning, the Nuclear Waste Policy Act sets up a procedure for selecting yet more repository locations.

The legislation directs the Energy Department to come up with five additional sites in coming years. After that list is pared to three, the President is to choose one by March 31, 1990, for the second facility.

The Energy Department, for which the waste-repository program provides millions of dollars in staff salaries and contracts with private companies, is eagerly going along with the search.

The department says that one of the pro-

posed rock formations for the second facility will be granite. Explains a department spokesman:

"There's a possibility that a site can be nominated in the East for the second repository, because there's a lot of granite around the Great Lakes and also running down the whole Atlantic seaboard from Maine just about down to Georgia."

"I think there's something like 17 states that have granite formations, so we'll be looking at those in detail over the next few years."

Among the states to be examined more closely are Pennsylvania and New Jersey. Both have rock formations deemed appropriate for further study.

In Pennsylvania, those formations are clustered in nine counties in the eastern part of the state — Berks, Bucks, Chester, Delaware, Lancaster, Lehigh, Montgomery, Northampton and Philadelphia.

In New Jersey, there are four counties with potentially favorable geology — Hunterdon, Mercer, Morris and Warren.

The repository itself, which would be carved out 2,000 to 4,000 feet below the earth's surface, would cover 2,000 acres. For this reason, restrictions on how the surface land can be used — no drilling, for example — would extend several miles beyond the buildings.

A repository would require substantial water supplies, since it would consume an estimated 500 to 1,400 gallons per minute, and whether served by rail or truck would become the hub of a nuclear mass-transit network, with radioactive-fuel shipments funneling in from all directions.

If sparsely populated, politically conservative states such as Nevada, Utah and Mississippi heededly oppose burial of high-level waste in their states, populous, politically powerful states such as Massachusetts and Pennsylvania would almost certainly oppose it even more vigorously.

Beyond that, the congressional mandate and Energy Department plans to build several repositories — not just one — create a credibility problem.

In a 1977 report, the General Accounting Office, the investigative arm of Congress, commented on the plans of federal energy officials at that time to build six repositories, with the first two to open in 1985. Observed the GAO:

"Another aspect of the waste repository program which is not, in our opinion, based on realistic appraisals is the goal of building six repositories in the stated time period."

"This goal appears overly optimistic in estimating the time required to identify, study, design, construct and confirm the feasibility of

repositories. Such an unrealistic schedule could further decrease the public's confidence in the Energy Department's waste management program."

Whatever progress the Energy Department makes toward construction of a repository, it also is required by the Nuclear Waste Policy Act to provide limited temporary storage at away-from-reactor facilities.

For some years, federal energy planners had contemplated using closed reprocessing plants in Illinois, New York and South Carolina for just such a purpose.

President Carter's 1978 National Energy Plan called for "modification of an existing storage facility either in Barnwell, S.C.; Morris, Ill., or West Valley, N.Y.," to handle the overflow of used fuel assemblies.

But when it became clear that the proposed Nuclear Waste Policy Act would implement that plan, the congressional delegations from all three states lobbied for a provision that would exclude them from consideration.

Illinois and New York, in particular, were sensitive about being turned into high-level nuclear waste dumps for other states.

Nearly 2,000 used fuel assemblies were stored at the Morris and West Valley reprocessing plants. While some of the assemblies came from nuclear utilities within the two states, many came from California, New Jersey, Wisconsin and other states.

California, long a pioneer in tough environmental laws — it has banned further nuclear power plant construction until a safe waste-management system is assured — has made especially good use of the Morris facility.

In fact, California has managed to transfer a larger percentage of its high-level radioactive waste beyond its borders than any other state. Of the nearly 1,100 used fuel assemblies discarded by California's utilities, more than one-fourth are stored in Illinois.

Lawmakers from Illinois, New York and South Carolina were so concerned about the reprocessing plants being converted to permanent storage depots that they sought, without success, to eliminate completely from the act the provision for temporary storage facilities.

To muster support for their cause, they invoked an argument that has run through congressional debate on radioactive waste for years.

Reduced to its simplest terms, that argument is this: The technology for the safe management of nuclear waste is perfected. The federal government must provide a storage facility for nuclear waste. That facility must be located in some other state.

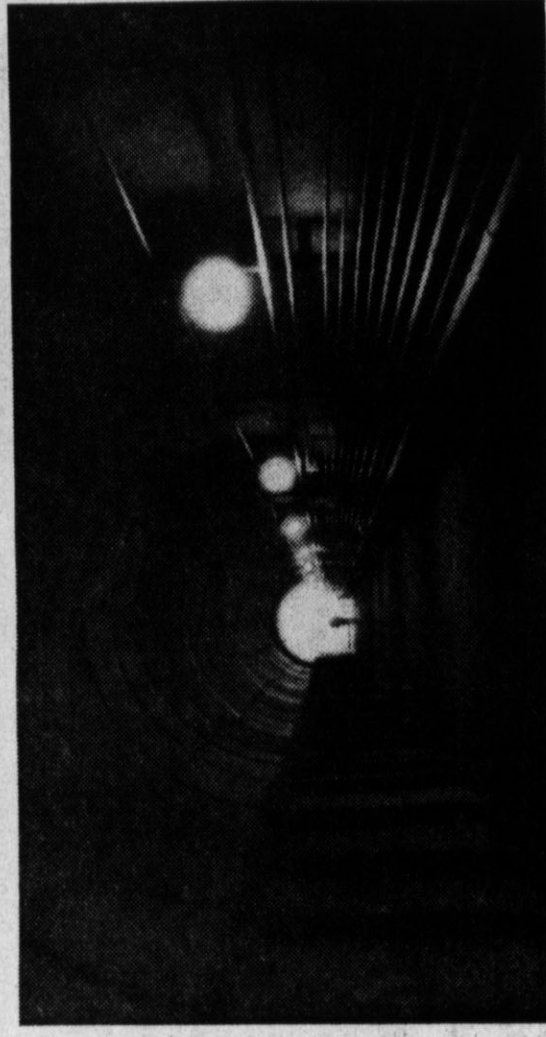
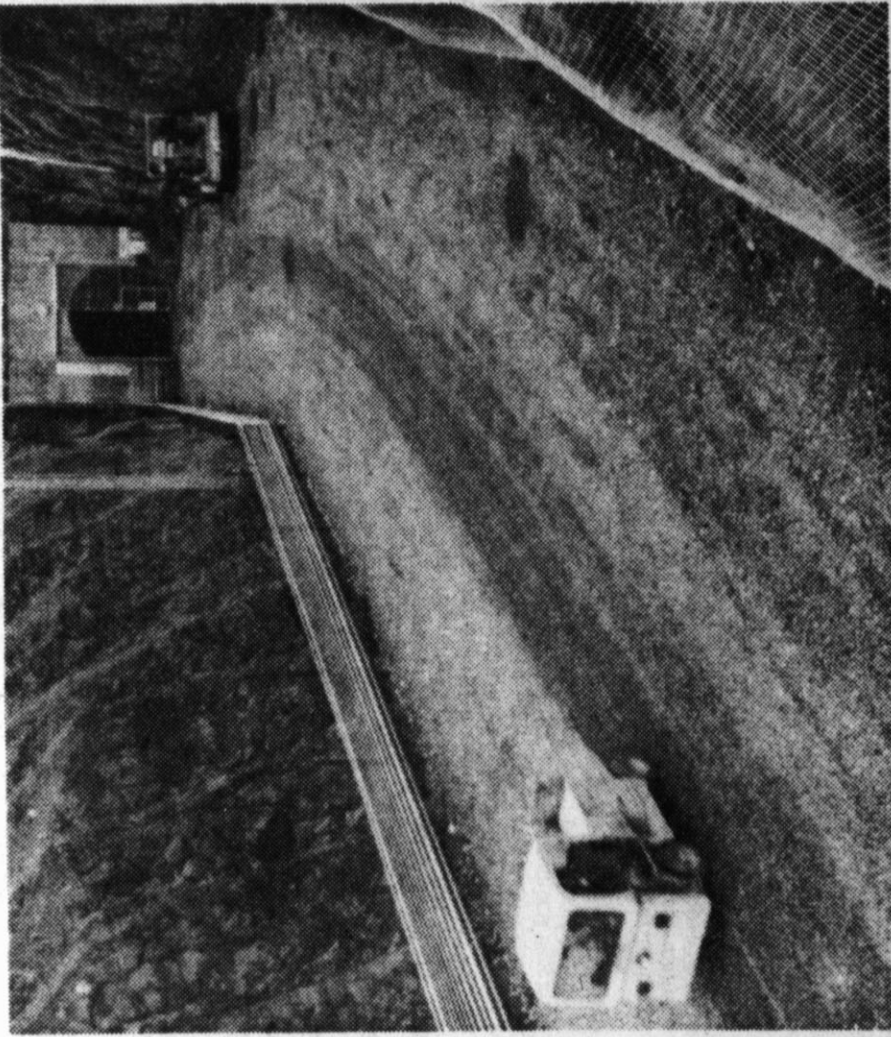
Jack Kemp, the Republican congressman from New York, used a variation of that argument when he sought a special deal that would preclude the selection of West Valley as a temporary storage facility. Said Kemp:

"I want to emphasize as well that my concern about the interim storage provisions of this bill does not stem from purely parochial interests."

"It is true that I strongly oppose allowing the West Valley site, in our community of western New York, to become a storage site."

"Congress is spending millions of dollars cleaning up the nuclear reprocessing plant at West Valley, precisely because the nuclear waste now stored there represents a real and very significant threat to public health."

"West Valley is not and would not be an appropriate storage site because of well-established geographical and geological factors."



WIRE MESH holds back loose rocks at the entrance to the Hanford site, top, and a reinforced tunnel, above, leads to the test area.

gentleman. After many years of work on nuclear waste legislation, we have been able to achieve a consensus bill that includes carefully drawn limited away-from-reactor storage provisions.

"These provisions preclude federal acquisition or use of private facilities in Morris, Barnwell and West Valley for the limited away-from-reactor storage program authorized by the bill."

That Illinois, New York and South Carolina lawmakers successfully worked out a special deal to prohibit storage of used nuclear fuel assemblies at the reprocessing-plant sites was especially significant.

Illinois alone accounts for 21 percent of all used fuel assemblies in the country, with 7,623 assemblies stored at power plants and the Morris reprocessing center. (Another 459 assemblies from other states also are at Morris, bringing the total in storage to 8,082.) It is, and will remain, the undisputed leader in the production of high-level radioactive waste.

Illinois has more nuclear reactors (seven) generates more electricity with nuclear power (about 30 billion kilowatt-hours) and has more nuclear plants under construction (10) than any other state.

New York ranks second, with 3,600 used fuel assemblies in storage — including 629 from construction of yet a third type of storage — other states at West Valley — and South Carol-

center — a "monitored retrievable storage facility."

Unlike a repository, where the used nuclear fuel assemblies would be buried permanently, this facility — constructed either above or below ground — would allow for the removal of assemblies sometime in the future.

The act directs the energy secretary to submit to Congress a detailed program for the construction of a monitored retrievable storage center, including three potential sites, by June 1985.

That's just six months after the energy secretary must narrow the list of prospective sites for a repository from five to three and forward his recommendations to the President.

Why would the United States even consider monitored retrievable storage centers if it planned to seal the assemblies in an underground repository?

Because four different factions in Congress, for four different reasons, wanted it. One group views the concept interchangeably with away-from-reactor storage, another guarantee that electric utilities will have a facility where they can ship their used fuel assemblies.

A second group strongly supports the re-summption of reprocessing — even though it is uneconomical and no industry is interested in it — and wants the assemblies stored so that they can be retrieved for that purpose.

As the late Sen. Henry M. Jackson (D., Wash.) explained, "We must address the question of whether spent fuel will be stored until a reprocessing capability is established in this country, or whether some spent fuel will be disposed of."

A third group, consisting of delegations from several potential repository states, notably Louisiana, sought the monitored retrievable storage facility as yet another insurance policy against construction of a repository in their states.

And a fourth group wants insurance in the event that federal energy officials — who have insisted for years that all the technology is in hand to build and operate a repository — turn out to be wrong.

A staff member of the House Interior and Insular Affairs Committee, who followed the nuclear-waste legislation through Congress, put it like this:

"There is a core of monitored retrievable storage supporters who sincerely do believe... that we are so far from being able to solve the nuclear waste problem safely that we shouldn't even be trying to build a permanent repository at all right now."

One of the strong advocates of the Nuclear Waste Policy Act, the committee aide said, supported the monitored retrievable storage concept because it was "100 over-confident to put all your eggs in a basket, that political or technical problems could just terminate the repository program and that you'd better have this backup answer in case things really get messed up down the road."

But the monitored retrievable storage system is, at best, a questionable backup. Once such a facility opens, many energy analysts agree, a permanent underground repository will never be built, barring some cataclysmic accident at the retrievable storage center.

They reason that it will be more economical — even if far more hazardous — to continue packing the used fuel rods into the retrievable storage center than to package and ship them to a repository.

By the turn of the century, a monitored retrievable storage facility could have as many as 30 million used fuel rods crowded into it. Of course, it's always possible that a series of such facilities could be sprinkled about the country to reduce the concentration of high-level radioactive waste in any single location.

Whatever the case, the risks are clear. Nearly a decade ago, the Environmental Protection Agency rejected a proposal by the Atomic Energy Commission to build "retrievable surface storage facilities" (RSSF) — the 1976 version of monitored retrievable storage facilities — at

the Hanford Reservation in Washington state, the only repository of its kind in the United States. The agency cited the potential for groundwater contamination and the risk of a major accident at the site.

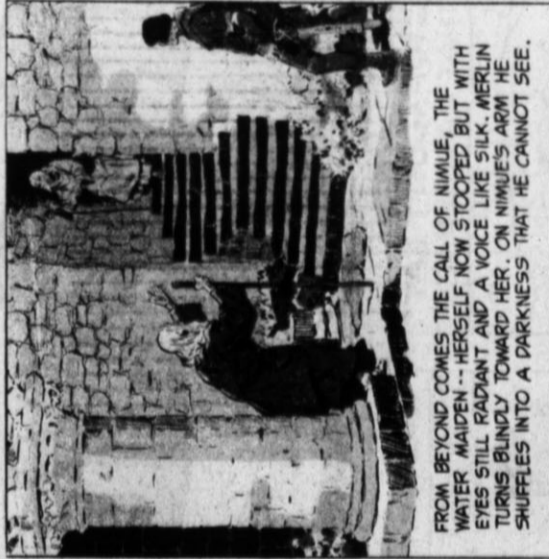
Prince Valiant

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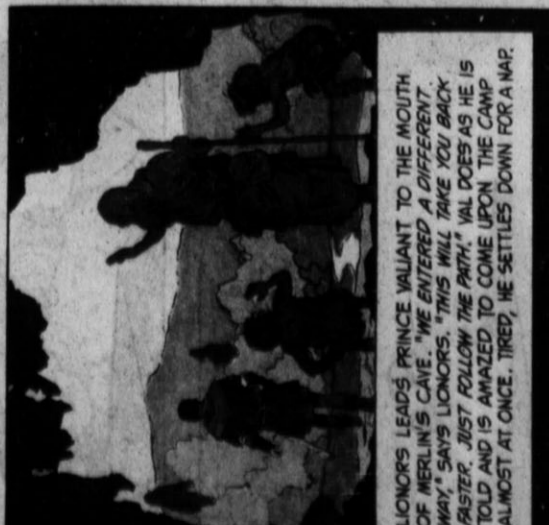
Our Story: "THE SECRET OF MAEVE'S BIRTH COULD DESTROY TWO FAMILIES AND TWO KINGDOMS," A FEEBLE MERLIN TELLS PRINCE VALIANT. "I CAN SAY NO MORE," AGAIN HE PASSES HIS HAND OVER THE POOL. "I'D RATHER GUESS ON A BATTLE," HE REMEMBERS THE FIGHTING BUT CANNOT RECALL WHEN IT WAS. "BEWARE OLD ENEMIES, 700," MERLIN SAYS.



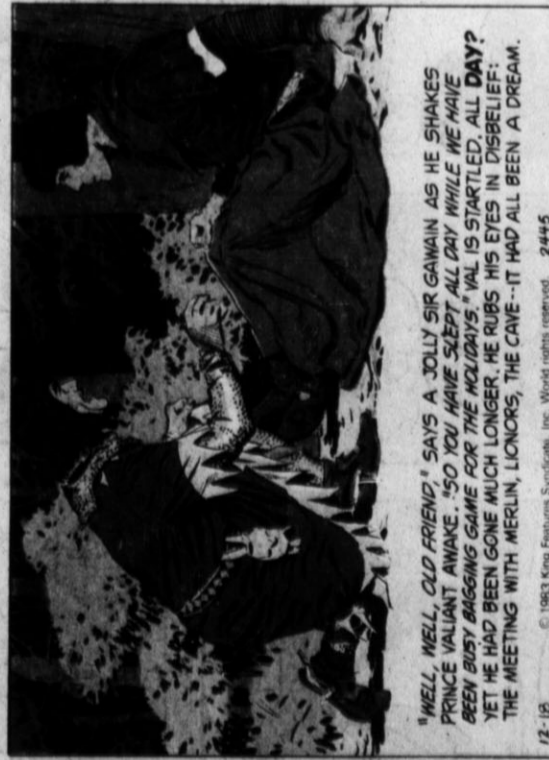
FROM HIS FINGER THE SCORCHER TAKES A RING. "SAY NOTHING TO ANY ABOUT MAEVE BUT GIVE HIM THIS. TELL HIM IT HAS BUT ONE USE AND CAN BE USED ONLY ONCE. IF HE DISCOVERS ANY MEANING, ALL WILL BE WELL."



FROM BEYOND COMES THE CALL OF NIMBLE. THE WATER MAN HAS HIMSELF NOW STOPPED BUT WITH THIS HE CAN GO FORWARD AND YOU WILL BE IN THIS BLINDLY TOWARD HER. YOU WILL BE AWAY. HE SHUFFLES INTO A DARKNESS THAT HE CANNOT SEE.



LONOR'S LEADS PRINCE VALIANT TO THE MOUTH OF MERLIN'S CAVE. "WE ENTERED A DIFFERENT WAY," SAYS LONOR. "THIS WILL TAKE YOU BACK TO THE CAVE. JUST FOLLOW THE POOL. VAL POSSESSES HE IS TOUSLED BY THE WATER. HE REMEMBERS THE WAY DOWN ALMOST AT ONCE. TIRED, HE SETTLES DOWN FOR A NAP.



"WELL, OLD FRIEND," SAYS A JOLLY SIR GAWAIN AS HE SHAKES PRINCE VALIANT AWAKE. "SO YOU HAVE SLEPT ALL DAY WHILE WE HAVE BEEN BUSY BAGGING GAME FOR THE HOLIDAYS." VAL IS STARTLED. ALL DAY? "YET HE HAD BEEN GONE MUCH LONGER. HE RUBS HIS EYES IN DISBELIEF. THE MEETING WITH MERLIN, LONOR'S, THE CAVE--IT HAD ALL BEEN A DREAM.



"OH YOUR CHIEF, THE KING, GAWAIN SAYS QUIETLY. "WHERE DID YOU GET IT?" VAL TAKES HIS HANDS FROM HIS FACE. SO IT HAD NOT BEEN A DREAM AT ALL.

NEXT WEEK: Frosting!

Hi Lois

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I CAN'T BELIEVE THIS, JERRY!
WE BUILT A GO-CART TOGETHER
WE DATE THE RICHARDSON TWINS TOGETHER!



WHAT ARE YOU DOING, CHIP?
TRYING TO FIGURE OUT WHO MY BEST FRIEND IS



YOU'RE MY BEST FRIEND!



DON'T YOU SEE... WE'RE INSEPARABLE!!



WHAT FOR?
WELL, YOU KNOW-- CHRISTMAS IS COMING!



WE PLAY BASEBALL AND FOOTBALL ON THE SAME TEAMS



WRONG! YOU GOTTA CLEAN YOUR ROOM BY YOURSELF!

COMICS

The Hereford Brand



ALL YOUR FAVORITE

SUNDAY, DECEMBER 18, 1983

BLONDIE



I'M GETTING UP EARLY SO I WON'T HAVE TO WAIT FOR THE BATHROOM



GOOD MORNING, DAISY



COOKIE WAIT! I NEED TO SHAVE AND BATHE!



I'LL BE RIGHT OUT, DADDY



SHE'S BEEN IN THERE FOR TWENTY MINUTES!



IT'S ALL YOURS, DADDY



COPS, I LEFT MY TOWEL IN THE BATHROOM



OH NO!



ALEXANDER I'VE GOT TO GET IN THERE!



IT'S ALL YOURS, DAD



AT LAST! THE BATHROOM IS FINALLY EMPTY!



GOODY THEN I DON'T HAVE TO WAIT TO WAIT

BETLE BAILEY



IS THE BOSS IN?
I HEARD THAT.



I'M NOT YOUR BOSS! I'M YOUR GENERAL! SEE?



I KNOW YOU'RE OUR GENERAL, BUT YOU'RE ALSO OUR BOSS



"BOSS" IS JUST ONE OF THE MANY TERMS THAT DESCRIBE AUTHORITY



HMM... I HADN'T THOUGHT OF IT THAT WAY



WHEN!

SUPREME COMMAND
TOP HONCHO
BIG DADDY
THE CHIEF
BOSS
GENERAL

by Mort Walker

Barney Google and SNITCH SMITH

by Fred Lasswell

MILTON CANIFF

POTTEE CANYON IS THE TARGET FOR A SNIPER — AND THE NEW YORK POLICE MOVE IN!

MISS CANYON, YOU ARE ENTITLED TO POLICE PROTECTION!

I SUPPOSE SO, BUT I CAN'T ACCEPT IT WHEN THE FORCE IS SPREAD TOO THIN AS IT IS!

WELL, MAAM, ... BUT PLEASE WE CAN'T COMPEL YOU TO ACCEPT PROTECTION...

DO NOT FOLLOW ... GO TO YOUR OFFICE BY DIFFERENT ROUTES, DOUBLE YOUR APARTMENT LOCKS...

LUNCH IN, OR GO TO DIFFERENT RESTAURANTS EVERY DAY

HERE'S A LIST THANK YOU!

SO POTTEE GOES HOME AND FALLS INTO BED EXHAUSTED FROM THE PRESSURES OF THE DAY. — AND THEN...

R-RINGGG!

9:30 PM

POTTEE, THIS IS MARY JOE — ARE YOU OKAY?

OH, YES! THANKS FOR CALLING!

10:30 PM

OH, THANKS VIRGILIA — I'M FINE!

11:30 PM

ZEE—HOW GOOD OF YOU TO CALL! NO SWEAT!

12:00 MIDNIGHT

MISS CANYON, THIS IS YOUR BUILDING SUPER-INTENDENT! I COULDN'T SLEEP — WORRYING ABOUT YOU!

YUH, YUH, 'MOKAY! THANGU!

YUH, YUH, 'MOKAY! THANGU!

THIRTY-SEVENTH PRECINCT... SGT. DEVLIN!

THIS P'TEEET C'NYN ... PLEASE GIVE ME P'lice PROTECTION — FROM MY FRIENDS!

12-10

BARNEY GOOGLE AND SNITCH SMITH

by Fred Lasswell

AIN'T IT NICE HAVIN' MY BROTHER BUBBA VISITIN' WITH US, TATER?

GOOBLE GOOBLE GOO

YORE PAW DON'T THINK SO NEITHER

MAW!! I'M SICK AN' TIRED OF THAT FREELOADIN' BROTHER OF YORN CAMPIN' IN MY HOUSE!!

AW, FIDDLE -- BUBBA'S ONLY BEEN HERE TWO DAYS, PAW

TWO DAYS!! IN THEM TWO DAYS HE'S ALMOST ET US OUT OF HOUSE AN' HOME

I AIN'T FEEDIN' THAT LAZY HULK ANOTHER DAY!!

LAZY? HE'S BEEN WORKIN' OUT YONDER IN TH' FRONT YARD TH' WHOLE BLESSET MORNIN'

DOIN' WHAT?

DIGGIN' POST HOLES AN' PAINTIN'

THEN I TAKE BACK ALL THEM MEAN THINGS I SAID, MAW

BUBBA SMITH

12-18

POKEY

By BOB ABERNETHY

THERE'S A NEW RESTAURANT!

I'LL TRY IT BEFORE WIMPY FINDS IT!

I NEVER FEELS SAFE ORDERIN' A HAMBURGER IN A PLACE WIMPY KNOWS!

STOP! DON'T EAT THAT HAMBURGER!

WHAT'S WRONG WITH IT? IT MIGHT MAKE YOU UNWELL!

THIS PLACE HAS A TERRIBLE REPUTATION! IS 'AT SO?

AS AN AUTHORITY, PERHAPS I SHOULD TRY IT FOR YOU!

OKAY!

GULP!

HUH?

YER A GOOD SWAB, WIMPY!

WELL, HOW WAS IT?

QUITE SALUBRIOUS!

AND THANK YOU FOR LUNCH!

12-18

REDEYE

by Gordon Bess

HI, POKEY!

WANT TO JUMP ROPE?

BOYS DON'T PLAY DUMB GIRL STUFF

HOW ABOUT WHEN THEIR MOTHERS ARE LOOKING FOR THEM?

POKEY! I NEED SOME FIREWOOD!

12-18

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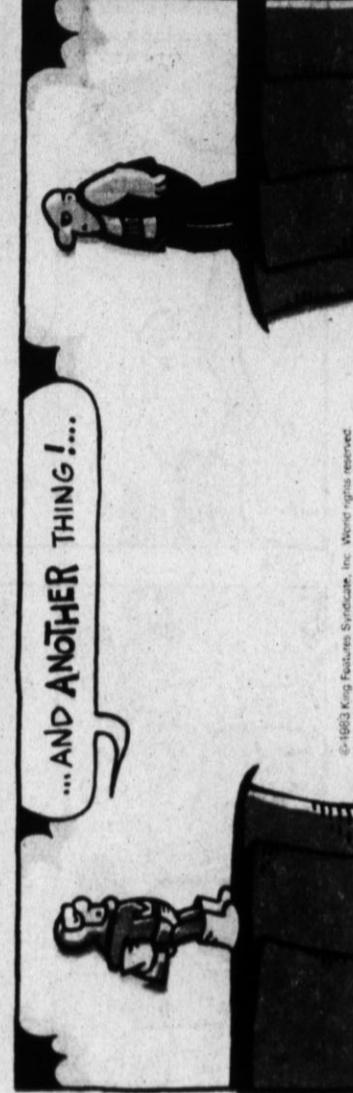
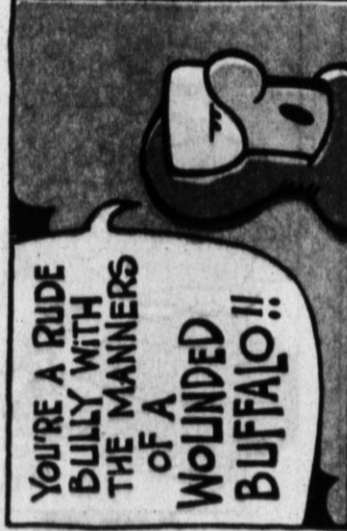
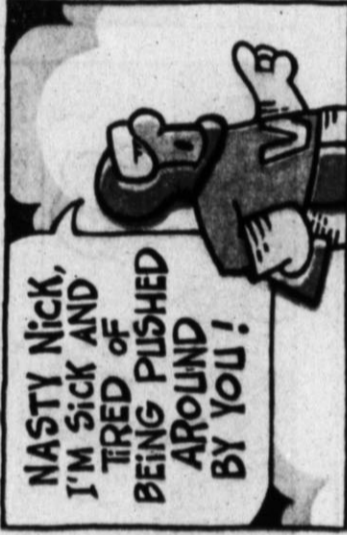
Moby
BY DON TRACHTE



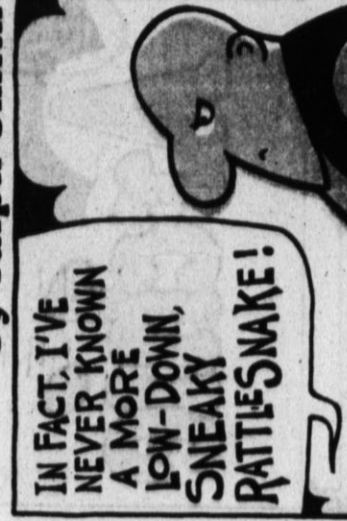
AGATHA CRUMM



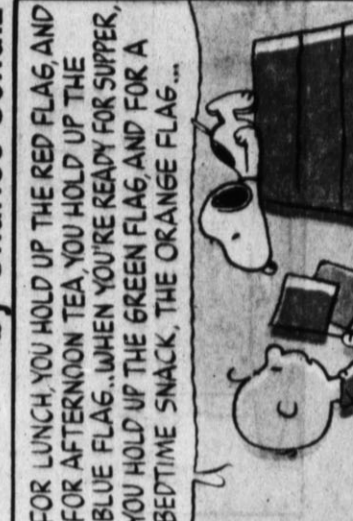
Captain Vincible



by ralph smith



PEANUTS®



TIGER



Archie



ARCHIE: WHERE'S JUGHEAD? DADDY'S BEEN CALLING HIS HOUSE ALL DAY AND GETTING NO ANSWER.

MARGE: WHERE'S JUGHEAD? DADDY'S BEEN CALLING HIS HOUSE ALL DAY AND GETTING NO ANSWER.

ARCHIE: I'M READY! WHERE'S THE TURKEY?



LATELY, JUGHEAD HAS BEEN SPENDING ALL HIS COIN ON VIDEO GAMES.

MARGE: TELL ME ABOUT IT...

JUGHEAD WON THE DRAWING IN THE CONTEST AT DADDY'S BANK.

MARGE: WHY DOES YOUR FATHER WANT TO TALK TO HIM?

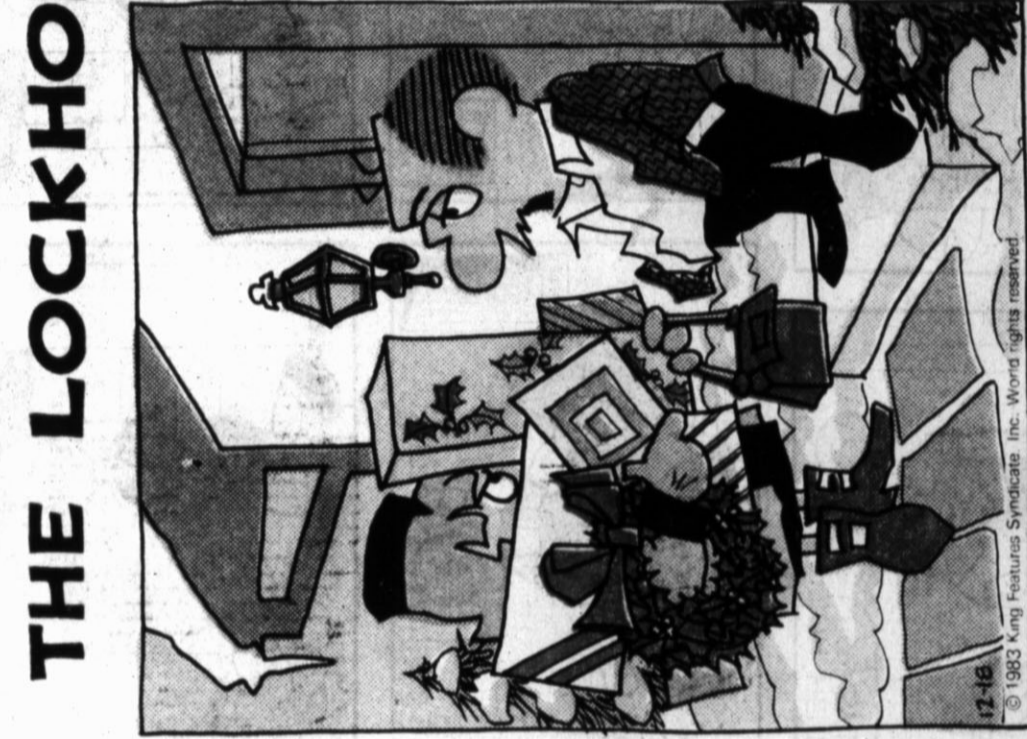


HE'S BECOME SUCH A FIXTURE AT THE ARCADE, THAT I ALMOST STUCK A COIN IN HIS NOSE AND USED HIS ARM FOR A JOYSTICK.

OH, WOW! I'M INVITED TO A TURKEY DINNER AT A FANCY RESTAURANT NEXT WEEKEND.

MARGE: THAT'S RIGHT. YOU TOOK UP FROM THE VIDEO SCREEN!

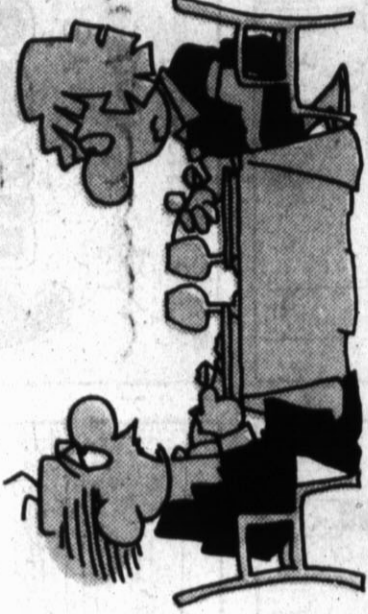
WHEN? WHAT A WILD DREAM! I GOTTA STOP PLAYING THAT VIDEO GAME WHERE THE GIANT TURKEY CHASES THE CHEF.



"MY WIFE YOU SAY? DO YOU HAVE ANY IDENTIFICATION?"

THE LOCKHORNS

by BILL HOEST



"DID YOU BAKE THIS OR DID YOU KNIT IT?"



"IF THERE'S ONE THING THAT GETS MY GOAT IT'S A HAPPILY MARRIED MAN."

HE'S BECOME SUCH A FIXTURE AT THE ARCADE, THAT I ALMOST STUCK A COIN IN HIS NOSE AND USED HIS ARM FOR A JOYSTICK.

OH, WOW! I'M INVITED TO A TURKEY DINNER AT A FANCY RESTAURANT NEXT WEEKEND.

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WHEN? WHAT A WILD DREAM! I GOTTA STOP PLAYING THAT VIDEO GAME WHERE THE GIANT TURKEY CHASES THE CHEF.



HA HA! LISTEN TO THE FUNNY SOUNDS HELGA'S PET DUCK MAKES!



FURTHERMORE, SHE GIVES US EGGS AND DOWN FOR OUR PILLOWS! WHAT DO YOU THINK OF THAT?!



YOU TREAT THAT DUCK LIKE A PET?

WHY NOT... SHE IS A PET!

KVACK! KVACK! KVACK!



THAT'S A PET?!

MY DUCK IS 10 TIMES THE PET YOUR DOG IS! SHE'S CLEAN! NEVER STRAYS! NO FLEAS! DOESN'T CHASE CATS!



HOCUS-FOCUS



CAN YOU TRUST YOUR EYES? There are at least six differences in drawing details between top and bottom panels. How quickly can you find them? Check answers with those below.

Junior Whirl

by Hal Kaufman

• **EYE-CUE-TESTER!** Been burning the candle at both ends recently? It may be in your best interests to take heed of this poem: "Late to bed and early to rise, and soon you'll have SENNUK YSEE." Rearrange cap-letter words for sense.

• **Sum Fun!** Santa added one to a number, multiplied the result by five, and obtained 460. Quickly, with what number did he begin his calculation?

• **Fruit Punch!** Find the name of a fruit in each sentence: 1. Chico rang earlier. 2. Garage sale Monday. 3. He buys cheap lumber. 4. I tip each waiter. 5. The champ earned his crown.

• **Riddle Me This!** What do you call a person who's crazy about balloons? A. balloon-atic. How did the blacksmith send his bill? In an anvil-ope.



RHYME REASON!

Clues to a question posed below are contained in the following vintage verse:

I see my first, I see my next, as plainly as can be. Joined to my third, don't look perplexed, you've often gazed at me.

My third is tiffy, and some more, reversed 'tis scarce an ell.

My all is reaching for the floor, clear as a crystal bell.

What am I? Hint: I disappear in spring.



FULL HOUSE! Our chimney sweep pal has discovered the cause of a household of empty, so-so, you-ay-adding lines.