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The West mines, mills & worships radioactive fuel URANIUM

Copyright 1978
by Justus Bavarskis

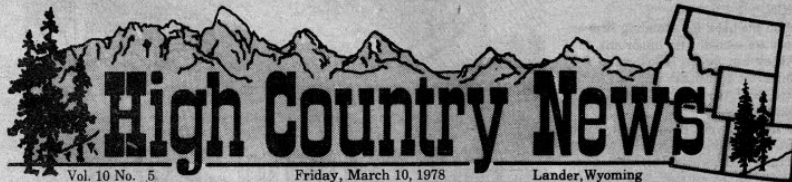
Glenrock, a town of 2,700 on the edge of eastern Wyoming's uranium beds and growing as rapidly as the energy industry that's building it, has adopted a song called "Glenrock's Vision." It is sung to the tune of "The Battle Hymn of the Republic."

The lyrics offer the world coal, oil, and uranium. The chorus rhapsodizes "Glen-

rock when there was little effort to control radiation in a mine are dying of lung cancer in numbers that amount almost to an epidemic, and increased cancer rates may occur among underground miners working under present conditions of drastically reduced radioactivity.

—Fairly high radioactivity has been found in rabbits living near a uranium mine and mill.

—Potentially dangerous amounts of



Vol. 10 No. 5

Friday, March 10, 1978

Lander, Wyoming

rock, Glenrock we salute you."

The song inspires visions of a Glenrock Chamber of Commerce meeting: A burning lump of coal serves for incense as the members recite financial statements, exchange hard hats, belt out a few rousing choruses of "Glenrock, Glenrock we salute you," then pray to the holy trinity — coal the father, oil the son, and uranium the holy ghost.

As with any other Western religion, the worship is a mixture of love for and fear of the deity worshiped. Fear easily could be inspired by these allegations about uranium production:

—The mining and milling of uranium releases more radioactivity into the atmosphere than nuclear power generation or any other part of the nuclear fuel cycle.

—Over 80,000 years 800,000 people in the Northern Hemisphere may die of lung cancer caused by radiation emanating from uranium mining and milling.

—Uranium miners who worked under-

ground when there was little effort to control radiation in a mine are dying of lung cancer in numbers that amount almost to an epidemic, and increased cancer rates may occur among underground miners working under present conditions of drastically reduced radioactivity.

—The mining and milling of uranium is releasing potentially harmful amounts of nonradioactive materials, such as selenium, into water.

To put the situation in perspective, it is necessary to weigh these allegations against the uranium industry's replies:

—Natural radiation kills far more people than radiation released by the uranium industry.

—Coal mining, for example, probably causes more deaths than uranium mining.

—The uranium industry disturbs only one-third as much land as coal-mining.

—A pound of enriched uranium produces as much electricity as 10 tons of coal, or 40 barrels of oil.

—The uranium industry is perhaps the most strictly regulated in American history, and, so far, probably is among the least profitable.

CANCER — OF UNCERTAIN ORIGIN

On Feb. 28, 1976, Eddie Glen Webster, 20, of Hudson, Wyo., once a member of his school track and basketball teams, fell down a ladder while performing his job of sampling radioactivity at Western Nuclear's underground mines near Jeffrey City. The arch of Webster's right foot slammed against a rock.

Bumps soon started to grow on the arch. An orthopedic surgeon in Anchorage, Alaska, where Webster had gone when he quit Western Nuclear, found cancer.

The cancer either was caused by radiation or was a form of osteomyelitis (inflammation of bone marrow), said the surgeon. He sent Webster to the Mayo Clinic in Rochester, Minn. There, on Oct. 11, 1976, doctors told Webster, "Your only hope is if we cut off your foot." They did so the following day.

"I am not an expert in this field," Mayo's Dr. D. J. Pritchard told Webster's attorney



FREE RANGE and wide open spaces. Prime habitat for antelope — and uranium.

Photo by Jeff Clack

in a letter Dec. 15, 1976. "I do know, however, that radiation can induce cancer in any tissue, and this patient does have a good history of radiation exposure. On the other hand, I believe the timing is probably not optimal in that it usually takes a longer exposure to produce such a tumor." Webster had been working at Western Nuclear for only seven weeks. His foot had not been examined before he went to work there.

Despite the medical uncertainty, Webster adamantly believes that radiation caused the cancer. Western Nuclear is equally adamant that the level of radiation in its mines is so low that radiation could not have been the cause.

Webster is bitter. "If I see one of those Western Nuclear executives in Hudson, I'll tell him why I'm doing what I'm about to do. I'll take my artificial foot off and beat him with it," he said.

He accuses the company of selectively recording only low radiation readings in the books it is obliged to keep, of deliberately failing to clear the mines when radioactivity reached high levels, and of disregarding the welfare of workers be-

cause "their cheapest investment, their cheapest parts, are labor."

The welfare of workers is a prime consideration, said Ted Keller, Western Nuclear's general superintendent at Jeffrey City, as he led me, occasionally through ankle-deep mud, along a tunnel smelling of wet cement. We were 900 feet underground in the company's new Sheep mine. A ventilation fan, installed to rid the mine of radiation, pumped 150,000 cubic feet of fresh air through the tunnel each minute.

"If I thought it was dangerous," said Keller, "I wouldn't be here. And one of those workers you saw back there certainly wouldn't be here. He's my son."

"We don't falsify records," said Paul Blair, the resident manager. "The way the system's set up, it would be nearly impossible to do that, even if we wanted to." As for failing to clear the mines, Keller said miners are ordered to the surface when the company judges radiation levels warrant such a step. Other workers, as well as Webster, have said miners were not taken

(continued on page 4)

What does uranium mean for the West?

Prosperity, for one thing, and probably more radioactivity than is released from all the nuclear power plants in the East.

HCN has devoted most of this issue to an examination of uranium — its promise and the problems it poses.

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HCN Letters

CHEESE-EATERS BEWARE

Dear HCN,

The Forest Service in Wisconsin has been spraying 2,4,5-T over wide areas of this state's northern forests for years. This spraying has gone on over the strident objections of Drs. O. Loucks and H. Iltis here at the botany department at the University of Wisconsin. The dangers of dioxin have been pointed out to the Forest Service but to no avail. As Wisconsin produces a major part of this nation's cheese and milk products, people should be aware.

I hope your very useful article (2-24-78) helps educate people about the problems of 2,4,5-T.

Mark Stromberg
Madison, Wisc.

SITE-BUILT SOLAR

Dear HCN:

The Feb. 10 story on commercial solar systems leaves the impression that there are only two solar heating options:

1. prohibitively expensive manufactured systems, or
2. inefficient and nondurable "home-made" systems.

We submit that there is a third option — a site-built system, designed to be integrated into a thermally efficient building. Such a system may be durable, efficient, and economical.

These site-built air systems are costing from \$2.50 to \$3.00 per square foot of the building and providing 60%-70% of the space heating requirement.

May the sun keep shining!

Sydney Wright

The Hawkweed Group Ltd.
Architects-Planners
4643 N. Clark St.
Chicago, Ill. 60640

2,4,5-T

Dear folks,

Last night I saw a news brief on a Boise TV station that discussed the controversy over the use of dioxin to control the growth of brush on timber lands in northern Idaho.

No mention was made of which national forests were involved, but I did catch something about Grangeville. That would be the Nez Perce National Forest in Idaho.

Today I received the 24 February edition of HCN with the lead story on 2,4,5-T by Justus Bavarakis. I would like to suggest that you send freebie copies of that edition to specialists in every national forest in Idaho.

Thanks for running the story.

Carl Brown

Mother Nature's Public Relations Office
Lake Fork, Idaho

MORE COAL ABUSES

Dear You-ell,

DSW's "King Coal's legacy of irresponsibility" (HCN 2-10-78) brings to mind another interesting item to be included in the list of examples of the coal industry's social conscience.

In the late 1960s when Pike County, Ky., was producing more coal than any other

county in the United States, it was in the bottom three per cent of the nation in terms of family income. At this same time, the county seat, Pikeville, with a population of less than 5,000, had more than 60 millionaires. During this time, Pike County was also noted for the high adult illiteracy rate of nearly one-fourth.

Although about a hundred million tons of coal are taken out of Kentucky mines each year and there are about 33 billion tons of coal under Kentucky, coal-mine owners fought attempts to impose a tax of even a few cents a ton to repair the devastation of mining and held out for a continuation of the annual fee of only \$100 per mine. It is sadly interesting to note that the lot of the common person in these coal producing areas, as opposed to the 60 millionaires, grew worse into the '60s and '70s, not better.

Keep the Faith.

V. Crane Wright, Asst. Director
Institute for Environmental Studies
Seattle, Wash.

SUCH MADNESS

Dear HCN,

A pat on the back for standing firm on the issues we consider so important. Edward Abbey can be my spokesman any time. He has the guts to say what the rest of us are too timid, too apathetic, too lazy — too cynical to say.

Good for the writer who was brash enough to allow as how he could do without sheep. I carry that one step further. I can do without sheep or cattle. Since I have eliminated red meat from my diet I feel honest in decrying grazing on public lands, fencing of public lands. The wildlife is being slowly and surely crowded off the face of the earth.

I can hear the chorus of "Aha's! You couldn't get along without the by-products of the industry." Well I do not especially like our dependence on the petrochemical industry for fabrics, leather imitations, etc., but think our petroleum products should be used for those things rather than to be burned up in cars and trucks. I am no friend of the trucking industry, one of the most powerful in the country. Ditto coal — it is too precious to be burned, and with such devastating effects on the environment.

Our house is built on sand. We are hooked. We can't change anything, no matter how deadly to life, because immediately the cry of lost jobs goes up. We couldn't even afford disarmament. Too many jobs at stake. Such madness.

Cynically yours,
M. Eads
Sheridan, Wyo.

Uranium mining and milling

In this issue three stories written by Justus Bavarakis about uranium mining and milling were paid for by the High Country News Research Fund.

To help High Country News produce similar reports on the developing West, send the fund a tax-deductible donation. Thank you.

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Please make out checks to Wyoming Environmental Institute — HCN Research Fund and send it to WEI, P.O. Box 2497, Jackson, Wyo. 83001. Thank you.



"BEEN FOOLING WITH URANIUM TAILINGS AGAIN, HUH?"

HIGH COUNTRY

By Tom Bell

Two significant events have occurred in the world that relate to our own energy situation in this country. First, it was reported that the Russian government had doubled the price of gasoline for its citizens. The price was said to have been raised from 65 cents to \$1.30 a gallon.

Second, the dollar was reported to be at record lows in relation to the other major currencies. As a result of that, an Arab spokesman said OPEC (Organization of Petroleum Exporting Countries) may be forced to raise oil prices to us.

The Russian action can be assumed to be to reduce domestic consumption. The question can then be asked, is this in response to recognition of diminishing oil reserves? A Central Intelligence Agency analysis says the Russians are faced with the reality of having to buy oil within a few years.

As the dollar continues to lose value on world markets, confidence in the United States as a world leader declines. That, in turn, leads to other economic difficulties, both here and abroad. International trade wars are in the making. It was trade "protectionist" policies that helped trigger and feed the Great Depression of the 1930s. A weakening dollar tends to promote more trade restrictions.

So what is the significance of these two events? These are just the most recent and outstanding indicators showing we and the rest of the world are in trouble. The leadership in both the White House and Congress has indulged in political waffling to the point where we face disaster.

This country should have been forced to bite the bullet in 1973 when the Arab oil embargo took place. Instead, the sick patient was given a tranquilizer and sent home when he should have gone to surgery. Now, as in the case of an untreated cancer, we face more drastic measures.

Skyrocketing oil prices led to the huge imbalance in trade. This, in turn, has led to the weakening dollar on world money markets. At the same time, we have had inflation at home. But as a people, we have

done virtually nothing to curb our insatiable appetites for oil and its products.

Five years after the oil embargo, we still do not have an energy policy. President Carter has the authority to take a number of unpalatable measures today, including gasoline rationing, if he so desires. Instead, we drift closer to catastrophe.

In a recent interview in *The Mother Earth News* (March-April, 1978) Lester Brown, president and senior researcher for the Worldwatch Institute (a Washington-based, private, non-profit research organization), says: "We're faced with a period of profound change in the years immediately ahead... change that's so profound — so all encompassing — that, in many ways, it's difficult to describe."

The changes I foresee derive from two important sources. One is the energy problem we're now facing, and the other has to do with the stresses being placed on the earth's biological systems.

"Of course, the energy problem is nothing new to most people. But I think there's been a tendency in this country to think of the energy dilemma as our grandchildren's — or perhaps our children's — problem... something that's lurking just beyond the turn of the century. Well, it's not. It's our problem... the present generation's problem."

Brown has written a book: *The Twenty-Ninth Day: Accommodating Human Needs and Numbers to the Earth's Resources*, W.W. Norton Co., 500 Fifth Ave., New York, N.Y. 10036.



Board feet versus 'magical places'

by Bart Koehler
Wilderness Society representative

The last day of March and April Fool's Day will be critical days for two potential Wyoming wilderness areas. Public hearings will be held — a congressional hearing in Powell concerning the Wyoming High Lakes on the 31st, and a U.S. Forest Service hearing in Dubois on the DuNoir on April 1st.

Both hearings will consider top priority additions to the National Wilderness Preservation System — but that's where the similarities end.

WYOMING HIGH LAKES

Rep. Teno Roncalio (D-Wyo.) has introduced a proposal designating 46,500 acres as wilderness for "discussion purposes only." This is his first step in a search for a "reasoned compromise" on the High Lakes issue. Teno says he hopes that both sides of the wilderness debate will "give a little." I wish all of us luck.

The hearing will not be a debate over commodity resources — it will be a debate between snowmobilers and wilderness supporters. Snowmobilers say that Teno's bill will keep them out of prime snowmobile country on the Beartooth Plateau. Wilderness supporters are quick to point out that only about one-fourth of the total acreage of roadless areas on the Beartooth Plateau in Wyoming would be included in Teno's proposal — leaving three-fourths open for non-wilderness uses.

Teno deserves our strong support in seeking the goal of wilderness protection in the High Lakes. I hope you'll write him.

THE DUNOIR

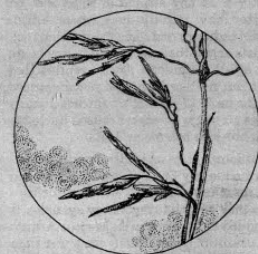
The DuNoir hearing will be a horse of a different color. The hearing will bring the timber industry into direct confrontation with wilderness supporters, ranchers, guides, outfitters, and the Wyoming Game and Fish Department.

It will be "board feet" versus elk calving areas, elk migration routes, nesting trumpeter swans, and magical places that

defy description. There will be little room for serious compromise.

The fight over adding the DuNoir to the Washakie Wilderness has gone on for 12 years. The Forest Service will be recommending only 11,000 acres of the original 30,000 acre DuNoir Special Management Area (which has been closed to timbering, roads, and vehicles since 1972) and proposing that the rest of the area be opened up to development such as timbering, new roads, and developed recreation.

When I opened up the draft land use plan for the DuNoir, I was outraged. I have



never seen such a disastrous plan. Virtually all the forest cover has been left open for the chainsaws. The Forest Service plans to give us the classic "wilderness on the rocks" and even leave out Pinnacle Buttes and Kissinging Lakes.

The DuNoir has successfully restored itself to a natural state since the tie-back days of the 1920s — yet the Forest Service included 13 photographs (dated 1922 and 1924) in the plan to show that the area truly is not qualified for wilderness. It's incredible that our tax money is paying for this agency's propaganda effort that proposes to tear the heart out of the DuNoir.

Wilderness supporters are recommending that 40,000 acres be added to the Washakie Wilderness — including the DuNoir and key adjacent wildlands.

Louisiana-Pacific Corporation, a behemoth timber company in Dubois, will claim that the DuNoir is the last available timber in the Upper Wind River Valley, and that the mill will fold up and blow away if the DuNoir's timber can't be devoured.

It's true that the DuNoir holds the last available timber supply in the area — simply because every other tributary of the Wind River above Dubois has already been

scalped. It's true that the Louisiana-Pacific is in trouble. The company will cast blame on the "damned environmentalists" but the real reason is corporate mismanagement, over-estimation of a sustained-yield timber resource, and a miscalculation of other natural resource constraints in the region, such as scenery, watershed protection, wildlife values, rough topography, and slow regeneration rates. The big mill will eventually fold — either now, or after the DuNoir has been sacrificed.

Six years ago, Teno Roncalio said that the DuNoir was probably the "most deserving area in all of Wyoming to be preserved as wilderness." Write the Shoshone Forest Supervisor in Cody (Shoshone National Forest, Cody, Wyo. 82414) for copies of the

Colo. House gives states' rights a good name

In many places, states' rights have a bad name. In the not-too-distant past, the states' rights banner was unfurled in the name of segregation and discrimination. In the 1950s and 1960s, states' rights were the philosophical underpinnings that moved many politicians, notably Alabama Gov. George Wallace, into the national political arena.

Since that era, states' rights arguments have popped up from time to time, usually when the states want to stop the federal government from doing something that needs to be done. As soon as the specter of federal intervention is raised, a governor leaps to his feet and grabs headlines hollering "states' rights." The governor, who more often than not hasn't tried to address the issues raised by the feds, argues that this is a matter best left to the states. The newspapers gleefully make it a major Constitutional crisis.

A good example of this is the recent brouhaha over federal water policy. This was a debate in which many Western governors, whose states have no comprehensive water policy of their own, denounced the federal government's effort to make them come up with one.

It often seems that the only states' rights being defended are the right to do little or nothing in the face of pressing problems, and the right to insure the continuation of inadequate or unjust programs.

One exception to this attitude in the recent past is the state of California's insistence on auto pollution emission standards that are stricter than federal standards. California recognized a problem — air pollution in urban areas — looked at what the

federal government proposed, and decided that it could handle the problem better. The state went beyond the federal government's lead and took command of its own fate.

Most other states, with similar problems, have merely knuckled under. The auto industry says that if the states want clean air, "We just won't be able to build any cars for you." These states, which so vigorously protest the intervention of the federal government, meekly comply with the corporate marketing strategy of General Motors.

Now, however, the Colorado House of Representatives, faced with an air pollution problem similar to California's, has taken a bold step to do something about it. It, too, has passed a bill that would require stricter auto standards than those mandated by the federal government. This action shows particular backbone in the face of a federal law that, influenced by the auto industry after California's initiative, prohibits states from adopting standards stricter than federal ones.

The Colorado House, in this case, deserves to be applauded for this bold step toward constructive states' rights.

The Colorado air pollution control effort will probably fail, largely because the state senate apparently doesn't have the understanding of its state's problems displayed by the house. The state legislators who approved this bill should be commended, however, for giving states' rights a good name after all these years. It's time that states' rights became more than a shelter for cry-babies.

—DSW

Does your lobby need a boost?

We heard recently that the Wyoming Outdoor Council (WOC) is \$1,000 in the hole. That may not surprise those of you who have followed the finances of WOC or who have small environmental group. What does seem strange, however, is that the council is short during the legislative session, a time when it has been so visibly helping environmentalists around the state. WOC, based in Cheyenne, keeps tabs on the Wyoming legislature and executive offices all year long. During the climactic excitement of the legislative session, you would think fund raising would be easy. shouldn't it be climatic?

The problem for WOC and other en-

vironmental groups, however, is that during the session environmental lobbyists don't have time to court dollars. The intensity of meeting legislative deadlines, while incurring a heavy debt, leaves no time for publicizing victories and polite fund raising. Most groups fight day and night for issues.

That's why the group that's lobbying for the environment in your state may not have asked for money yet. Its staff may be too busy working for you.

Why not surprise your lobbyists? See if they could use a financial boost. We know WOC (Box 1184, Cheyenne, Wyo. 82001) could.

—JN

Mar. 10, 1978 — High Country News-3



DuNoir Draft Land Use Plan. Written comments are due June 2.

We all have to give our best effort this year so we can insure that wilderness will be the DuNoir's future.

ruption (ruk' shən)

n. a disturbance; a row.

The L.A. Times recently described HCN as a media maverick creating a disturbance in the Rocky Mountain West. It's true: HCN does occasionally create a ruction in its editorial and reader response pages.

However, most of the paper tells of disturbances created by the Forest Service, big business, mining interests, the Bureau of Land Management, legislators, and other outspoken folks on both sides of the rapid growth argument.

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Uranium...

(continued from page 1)
out on a few occasions when, for example, power failures shut off the fans.

In the past, radiation was a critical health problem in underground uranium mines. Some contend it still constitutes a hazard, though the industry disagrees.

The specific type of radiation that has caused cancers in uranium miners is associated with radon gas. The gas shows up when thorium, always present in uranium-bearing ores, decays and forms radium, which as it decays, in turn, releases radon — an inert, odorless, colorless gas. The radon itself is harmless. But, as it decays, it releases lead, bismuth, and two

uranium miners may be no higher than among the population at large.

All studies show that lung cancer rates are particularly high among uranium miners who smoke cigarettes, far higher, in fact, than among nonsmoking uranium miners or nonminers who smoke. It is thought that the heat of a lit cigarette makes the radon daughters even more hazardous than they normally would be.

Though smoking is forbidden in all underground uranium mines, it is common knowledge that many miners nonetheless do smoke while they're working, and the companies are virtually powerless to prevent them. At Western Nuclear, Keller said an underground miner caught smoking is fired.

Some researchers have suggested that, under present conditions, uranium miners

will cause some cancer," Archer said in a telephone interview. "But the amount of cancer it causes is on the order caused by cigarette smoking, and people seem willing to accept that, so I'm not too worried about



it. Even if they could reduce radon levels further, there still would be some risks. So it's a matter of trying to decide how much risk to tolerate."

This opinion is based on the widely, though by no means universally, accepted theory that any amount of radiation, no matter how minute, may cause harm. While industry and some independent scientists argue that present radon levels are not at all hazardous, Archer replies that that can neither be proved nor disproved for the next 15 years or so, since it usually takes 15 years for cancer caused by radon daughters to become evident.

Although state and federal mine inspectors frequently find higher radiation than the companies report in self-monitoring data they submit to regulatory agencies, it is agreed that radon levels in most American uranium mines usually are lower than the law allows. It would take a miner 40 years to absorb 120 working level months — the amount Archer estimates doubles a person's chances of getting lung cancer.

Dr. William Ellett, of the EPA's Office of Radiation Programs, declines to predict uranium's long-term effects. He declines, too, to compare uranium's hazards with the hazards associated with coal, oil, and natural gas. "Until we know more about the health effects due to the long-term environmental pollution caused by other given energy cycles, comparison of the health risk for various fuel cycles is premature," he said.

HAZARDOUS, ABANDONED

Dr. Petr Beckman, an electrical engineer at the University of Colorado, in 1976 wrote a book called *The Health Hazards of Not Going Nuclear*. The book argues that nuclear power is safe, but that it is considerably less hazardous than any other type of energy production.

Writing at times with a pen dipped in vitriol, Beckman accuses antinuclear crusaders such as Ralph Nader of alarmism, of misinterpreting and distorting data, and of choosing to use only information that agrees with their preconceived ideas. Yet Beckman employs precisely the

same techniques he accuses Nader of using.

One would not know from reading Beckman's book, for example, that uranium tailings piles exist. Yet these piles, each occupying tens of acres of land and containing up to two million tons of radioactive earth from which 90% of the uranium has been extracted, present probably the greatest single hazard of the nuclear fuel cycle, according to the Environmental Protection Agency (EPA). Recent reports both by EPA and the Nuclear Regulatory Commission (NRC) indicate that these piles may threaten the health not only of people living near them, but also of those living thousands of miles away. The health threat persists at least for 80,000 years.

"These (NRC and EPA) appraisals, contrasting sharply with earlier evaluations that considered mines and mills to have only local impact, usually dismissed as negligible owing to the low population densities of the areas in which the facilities were located, reflect a growing concern over the possibly serious adverse environmental effects generated by uranium mining and milling," Thomas Buhl, of the New Mexico Environmental Improvement Agency's radiation protection section, wrote in a report to the state legislature last December.

As the uranium ore moves through the mill, about 93% of its uranium oxide is removed. Since the average ton of ore contains only about three pounds of uranium oxide, virtually all the ore processed

"By and large the new companies are doing a good job. But I think the situation also requires vigilance."

through the mill ends up as waste, or tailings, slurred with thousands of gallons of water.

Although the tailings contain little uranium, they nonetheless contain about 85% of the radioactivity that was in the original ore.

This is because milling removes virtually none of the thorium that, as it decays, eventually results in the release of radon daughters. While radon has a half-life of only 3.8 days, thorium's half-life is 80,000 years. (A half-life of 80,000 years means that it takes that long for half the thorium

(see next page)

Present exposures to radon gas in underground uranium mines will cause some cancer, "but the amount of cancer it causes is on the order caused by cigarette smoking, and people seem willing to accept that."

types of polonium; these are called radon daughters.

The radon daughters attach themselves to dust particles that a miner may breathe into his lungs.

"Mining of metal ores in central Europe... had been known for some four centuries to have a strange and harmful effect on the lungs of miners," states a paper in a publication called *Industrial Toxicology*.

Miners digging up pitchblende, a mineral containing uranium, both on the German and Czechoslovakian sides of the Erz Mountains were dying at what should have been the prime of life. In 1879, two German doctors found that 75% of the dead miners had been killed by lung cancer.

It was not until several decades later that the daughters of radon were identified as the culprits.

Yet, though it could hardly have been unfamiliar with these findings, the Atomic Energy Commission (AEC) ordered no safeguards for uranium miners when it started stockpiling atomic weapons in 1947. As a result, miners in the Colorado Plateau worked under radon conditions every bit as severe as their 19th Century European counterparts.

Hundreds of these American miners have died. Dr. Victor Archer, medical director for the National Institute of Occupational Safety and Health's (NIOSH) western laboratories in Salt Lake City, 20 years ago began a study of the Colorado Plateau miners.

In 1976, Archer, together with other researchers, said in a paper published by the New York Academy of Sciences, that 3,366 white miners had been examined, and 746 of them had died. He also said that 107 of 789 Indian miners had died.

The incidence of lung cancer among both white and Indian miners was much higher than lung cancer among the general population of the Colorado plateau, Archer found.

Recent research suggests uranium miners exposed to high radon levels have five times the average number of chromosome defects, Archer said. Parts of chromosomes were missing, some chromosomes had two centers instead of the normal one, others were upside down or ring-shaped instead of the normal rod shape.

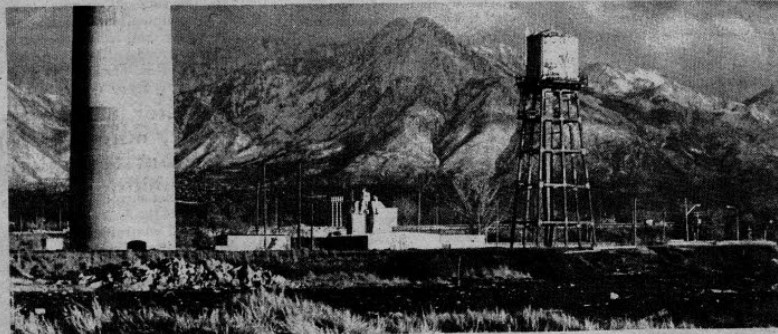
Whether these aberrations mean that genetic defects would be handed down nobody knows, Archer said. But the number of chromosome defects rose as the amount of radiation increased, he said. Under present conditions, Archer said, radiation-caused chromosome aberrations among

who do not smoke probably are no more susceptible to lung cancer than the general population, but Archer disputes that.

Archer and others were publishing their findings in the early 1960s, but it was not until 1967 that any move was made to reduce radon levels in underground uranium mines. Indeed, during the 1950s, anyone criticizing the weapons program and, by extension, the conditions of uranium production, was accused of being disloyal, subversive, and communist. The federal government belatedly clamped down on the industry only when the atomic arsenal was as big as the AEC wanted it to be and when the uranium boom of the 1960s was in decline, wrote Jessica Pearson, an assistant professor of sociology at the University of Denver, in a 1972 NIOSH publication called, "A Sociological Analysis of the Reduction of Hazardous Radiation in Uranium Mines."

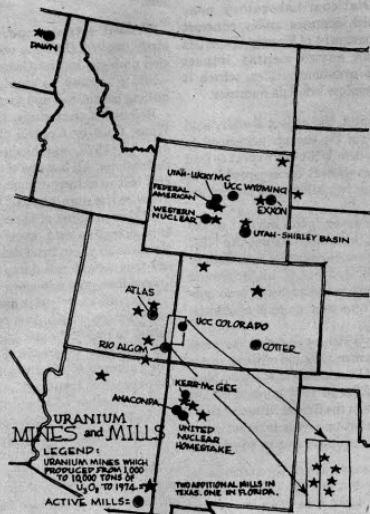
Even then, it was not the AEC but Secretary of Labor Willard Wirtz who proposed that radiation in underground uranium mines be limited to 12 working level months per year. (A working level is a measurement of exposure to radon daughters, and a working level month measures the amount of radon daughters a miner is exposed to during a month.) Four years later, the standard again was reduced to its present four working levels. By comparison, the early miners were exposed to thousands of working level months in the course of several years mining.

"I'm quite sure that present exposures



ABANDONED URANIUM tailings may pose health hazards, and this Vitro pile in Salt Lake City may be the most hazardous of all because it is in the middle of a population center.

Photo by Jack McLellan



to decay, another 80,000 years for half of what remains to decay, and so on.)

So long as the mill is functioning, it is generally agreed that the tailings are releasing relatively little radon into the atmosphere, because the slurry keeps them wet, and moisture greatly slows the passage of radon. Also, the tailings ponds frequently are treated with barium chloride, which settles radioactive materials to the bottom of the pond.

Once a particular ore body is exhausted, however, and the mill shut down, the tailings dry out. The gamma radiation they emit is dangerous only to animals and people living or working virtually on top of the pile. But the radon released by a pile in New Mexico may eventually harm a stockbroker in New York.

In addition, "Radon gas is released from the leach tank vents, ore piles . . . and the ore crushing and grinding ventilation system," said the EPA in a 1973 "Environmental Analysis of the Uranium Fuel Cycle."

Mines, too, release radon.

"After release it was assumed that the radon will distribute over the eastern United States and into the Northern Hemisphere, causing health effects," said the EPA report. ("Health effects" is one of the scientific bureaucracy's pet phrases. A health effect as used here means a death.)

"While the dose to any individual is extremely small," the report went on, "the number of people exposed is large so that . . . the number of predicted health effects is significant."

Ellett in a 1976 report estimated that five people could die of cancer caused by radon daughters for each gigawatt-year (a gigawatt is one million kilowatts; a gigawatt-year is 8.76 billion kilowatt-hours) of electricity produced by nuclear power.

Dr. Robert Pohl, a physicist at Cornell University, used the same figures as the EPA, but arrived at vastly different conclusions.

Death projections by EPA and NRC extend only for 100 or 25 years. The proper way to make such projections, Pohl contends, is to calculate them over the 80,000-year half-life of thorium. Assuming that, by the year 2000, nuclear power is cranking out 4,000 gigawatt-years of electricity in the U.S., the radon emissions

from mill tailings would kill 800,000 people in the Northern Hemisphere — half of them in the U.S. — in 80,000 years, Pohl said. That works out to 10 deaths per year.

Estimates vary for deaths caused by pollution from coal-fired plants, but the general range is between 20 and 100 per year for each 1,000 megawatt plant. Most coal-fired plants, however, are in areas far more thickly populated than uranium mines and mills.

There is no disagreement that, as radon moves away from a mine exhaust or a tailings pile, it diffuses. Within a mile or two, it is difficult to separate the man-liberated radon from radon that naturally exists. The argument frequently is presented that, because of this diffusion, and because uranium mining and milling normally take place in the thinly populated deserts of the Rocky Mountain states, the radon released by uranium operations is relatively harmless.

But the climate may change and people may in time flock to the presently barren deserts that house the tailings piles, Pohl said.

"For 80,000 years — essentially forever — somebody has to make sure that nobody builds houses or raises cattle near the tailings pile," Pohl said during a telephone interview. "How can anybody assure that the site will be closed off for 80,000 years?" he asked.

To Ellett, 80,000 years is such "a long period of time that the risk cannot be quantified meaningfully." He believes it is more realistic to stick to 100 years.

To Dr. Robert W. Buechley, an epidemiologist at the University of New Mexico studying rates of lung cancer in present-day underground uranium miners, Pohl's death estimates are questionable. "I think (Pohl and other scientists who make similar projections) have arrived at convictions direct from suspicions. They've not gone through the necessary steps of finding proof."

"No one says that nuclear power is going to be free of accidents," said Paul Blair, resident manager of Western Nuclear's operations at Jeffrey City, Wyo. "I'd have to say Pohl's figures are wrong, but it's a mathematical calculation and I'm not a mathematician."

"Uranium is like any other industry. There are hazards involved. No one has

concrete figures that can define the extent of the hazard."

Industry does its best to reduce the hazard, Blair said. "We're not in the business of killing people."

WHO PAYS FOR OLD PILES?

The Atomic Energy Commission, however, from the late 1940s to the late 1960s, was in the business of killing people, or at least of making sure the country had the means to do so through nuclear warfare.

From the time uranium production began until very recently, the AEC steadfastly denied any responsibility for

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the building ban could be maintained indefinitely unless the federal or state government . . . acquires the land," said the firm's report.

To move the pile could cost up to \$30 million, Ford, Bacon & Davis said. Federal agencies, though they appear to be preparing to ask Congress to appropriate funds to relieve the hazards from such piles, for more than a decade have done little more than talk about and study them.

Neither the state nor the city government has made any effort to take control of the Vitro pile and bill the federal govern-

One report concludes that the Vitro tailings pile in Salt Lake City almost doubles the lung cancer risk for anyone living within half a mile of it. For now, there is a ban on building within this half-mile zone.

uranium mines or uranium tailings. The ore as it came from the mine and the tailings as they left the mill did not contain enough radioactive materials to fall under the legal definition of "source material," so AEC had no jurisdiction over those aspects of nuclear power, the agency said.

It stuck to this argument despite the fact that nearly all the uranium produced between 1947 and 1970 was produced specifically for the federal government, sometimes even by government-created companies.

As a result, no company, and no federal agency, has yet assumed responsibility for the 22 abandoned uranium tailings piles, most of them in Colorado, New Mexico, Wyoming, and Utah. Some companies, however, still hold active licenses for a few of those piles, in the hope they can extract more uranium oxide from them.

In 1976, the Energy Research and Development Administration, now the Department of Energy (DOE), prodded by EPA, signed a \$2.6 million contract with the Salt Lake City consulting firm of Ford, Bacon & Davis Utah, Inc., to assess the possible hazard of each of those piles.

For the most part, the firm concluded that the hazards are negligible because, although the piles emit radon, they are in sparsely populated areas, so very few people are exposed to any significant concentrations of radon daughters.

But one of the largest of these piles, left by Vitro Chemical, is four miles from downtown Salt Lake City. Others are within a few miles of Rifle, Durango, Gunnison, Grand Junction, Slick Rock, and Naturita — all in Colorado; Riverton, Wyo.; Shiprock, N.M.; and Mexican Hat, Utah.

Using estimates on the effects of low-level radiation put out in 1972 by the National Academy of Sciences — estimates

"We have few choices in the matter of energy. For me, man has no choice but to explore the possibilities."

that, incidentally, have been characterized as too liberal or too conservative — Ford, Bacon & Davis concluded that the Salt Lake City pile almost doubles the lung cancer risk for anyone living within half a mile of it. Within 25 years, if the present ban on building within a half-mile radius is rescinded, and high-density building takes place, the pile will kill 110 people, the firm said.

"It would be unrealistic to assume that

ment because "We can't afford to take the chance" of not getting repaid, said Dennis R. Dalley, director of the Bureau of Radiation and Occupational Health of Utah's Department of Health.

"There's a moral question, too," Dalley said. "The pile was put there for the common defense of the country, so some of us feel that all the citizens of the country ought to be involved in reclaiming it."

Isn't there the further moral question of possibly causing some deaths while governments haggle over who pays? "That's absolutely right," said Dalley. "We don't think anyone is going to die immediately because of the pile, but it's a long-term hazard, and we want to see it resolved."

The pile is fenced. It bristles with warning signs. But an access road runs through it, and motorcyclists sometimes cut the fence so they can joyride up and down the pile, Dalley said. Children cannot read the signs. "I presume children still play on it occasionally," he said.

Because it is almost in the middle of a metropolis, the Vitro pile is atypical. Other piles pose the same hazards, but they are in or near much smaller communities.

What happened at Grand Junction, Colo., has been well documented. There, Climax Uranium Co., a division of Amax, Inc., gave uranium tailings to anyone who wanted them. Building contractors snapped up the offers of free gravel. More than 5,000 homes, and some schools, and churches, were built partly with uranium tailings in the 1960s. Since then, the federal government has spent several million dollars trying to clean up the mess.

On a much smaller scale, uranium tailings have been used for building in Durango and Rifle, Colo.; Lowman, Idaho; Shiprock, N.M.; Salt Lake City, Utah; and Riverton, Wyo.

Dr. Herbert Lubs got \$100,000 from the EPA to study whether tailings used in buildings in Grand Junction had caused birth defects. Lubs, an associate professor of pediatrics at the University of Colorado Medical Center, found five cases of genetic defects, but only in three of them were the parents exposed to radiation emanating from tailings used in construction.

Neither Lubs nor the EPA considered this adequate for reaching any conclusions. Lubs had planned a three-year study, but after a year, the EPA told him on Feb. 12, 1973, that the funding was being cut off because "The likelihood of this study yielding any meaningful information on the cytogenetic effects associated with low dose . . . radiation is extremely small."

"Maybe it was just an administrative goof, or maybe they just wanted a little

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Uranium...

(continued from page 5)

study to quiet concern and didn't want a full study in the first place," Lube said. "I should say that the amount of radiation anyone received was really quite small. The odds of finding anything were pretty small." But if the study had continued and he had found no unusual rates of genetic defects, that still could have been an important finding, Lube said.

Now, Dr. Stanley Ferguson of the Colorado Department of Health is looking at the incidence of lung cancer, leukemia, and other diseases known to be caused by radiation in the Grand Junction area.

"Some early data suggest that these (diseases) are much higher (around Grand Junction) than in comparable population areas of the state," said Dr. Kenneth Lampert, director of the Mesa County Health Department. Ferguson said, "It would be entirely premature" to talk about the study because the data so far are "very preliminary."

IN THE SOIL, WATER, AND AIR

As the abandoned tailings filter radon into the air, they also are contaminating the soil. More, they are releasing radium, the father of radon, into a few streams and underlying groundwater used to water livestock and, rarely, for human consumption. Further, while the tailings in most cases have not yet contaminated groundwater, Ford, Bacon & Davis said some of the piles have the potential to do so in the future.

At Rifle, Colo., for example, "There is evidence of contamination of the surface water (the Colorado River) adjacent to the tailings piles, and the hydrologic conditions at the site indicate a potential for groundwater contamination," the consulting firm reported.

In Riverton, Wyo., groundwater is used "for domestic water supplies without treatment over much of the rural area," the firm said. "There is a potential for contamination of the unconfined groundwater, of the surface waters into which it discharges, and of the unconfined groundwater system which is recharged in the area."

The tailings also contain high concentrations of lead, arsenic, chromium, barium, and selenium. Selenium is the heavy, nonmetallic element in locoweeds that

Theories abound, but no one yet has figured out how to stabilize the piles. Gamma radiation, everyone agrees, is easy to block. A foot or so of earth cover will do the job. Radon, however, is another matter.

Theoretically, 20 feet of loose earth cover may slow the passage of radon enough so it decays before it reaches the surface. But no one has tried that, so no one knows if it will work. Some think that perhaps six feet of dense clay, and a few feet of earth on top of that, may halt radon. Chemical sprays have been tried on one pile, with little long-lasting effect.

Dr. Robert Pohl of Cornell University said the tailings should be mixed with concrete, then buried back in the mines they came from. Industry and the NRC argue that this treatment would cost about \$40 million for the average pile. But the proper way to look at the cost, said Pohl, is to ask how much it would add to the price of a kilowatt-hour of electricity — one-tenth of a penny, he said.

Ford, Bacon & Davis ended their reports on each of the piles with a cost-benefit analysis. The firm recommended, in some cases, doing little more than fencing off and monitoring the tailings. In the more serious cases, it proposed several options, including moving the pile to another location.

It estimated, too, how much a specific action would cost, and how many lives it might save. At Shiprock, N.M., the company said, moving the tailings four miles, covering them with two feet of earth, and building a six-foot chainlink fence around the pile would cost \$5.8 million, but would save 99 lives over 100 years. Merely covering and fencing the pile would cost \$540,000 and save eight lives in 100 years.

In other words, by its cost-benefit analyses, the company is inviting the federal government to set a dollars and cents figure on the value of human life.

TAILINGS MAY TRIPLE

While a great deal of money and attention has been lavished in recent years on the abandoned tailings, some attention now also is being paid to the 16 active mills that, together, are spitting out tailings at the rate of 32,000 tons a day. The number of mills, and consequently the amount of tailings, may triple within the next 25 years.

Responsibility for uranium mines and mills is fragmented. Until last year, states could inspect mines themselves or leave that up to the U.S. Mining Enforcement and Safety Administration (MESA). A new mining law, however, makes no provision

for them even when the work is done on federal land in the state.

Argonne National Laboratory near Chicago, which operates under contract with the Department of Energy (DOE), is preparing an environmental impact statement on uranium milling, which it expects to complete late this summer.

George Montet, the project leader, said the study is not far enough advanced to discuss in any detail, "But we expect to find that radon levels will be acceptable for someone living two kilometers downwind of a mill."

Argonne, however, is looking just at the mills — not at the mines, because the NRC contends it has no jurisdiction over mines. The water pumped out of underground mines dumps more radioactivity into surrounding streams than do mill effluents, says the EPA.

The country's richest ore, and its most intense uranium mining and milling, occur in the Grants Mineral Belt in western New Mexico. The EPA in 1975 studied radon concentrations in the Grants Mineral Belt, and followed that up a year later with an examination of groundwater in the area.

Significant exposures of populations in active mining and milling areas such as the Ambrosia Lake area may be occurring," the EPA said. However, the study was conducted in November, when temperature inversions made it likely that radon concentrations would be at their highest. The EPA suggested further, long-term studies, and the New Mexico Environmental Improvement Agency (NMEA) has been conducting one for the past year.

Wyoming produces 31% of the country's uranium.

"Direct emission of radioactive materials into the atmosphere is a routine practice," Tom Buhl of the NMEA's radiation protection section told the state legislature in a December 1977 report. "Large quantities of mine air, with extremely high radon content, are normally exhausted to the environment without treatment. Fine yellowcake (uranium oxide) particulates are vented to the atmosphere as a routine procedure in mills."

"These airborne releases are not as well studied as those from the tailings, but they have been estimated to represent a comparable source of contamination . . . The risk to health is particularly serious in enclosed areas such as homes, schools, or offices, in which the ventilation may be restricted."

The other EPA study said that "industrial, municipal, stock, and private domestic wells" tap the groundwater. Near the United Nuclear-Homestake Partners mill at Grants, radium levels were below EPA drinking water limits, but they had increased in the past decade. Selenium levels were up to 340 times the recommended maximum. "As a result of widespread selenium contamination, a cooperative state-industry program is under way to provide alternate potable water supplies for the local populace," the study said.

Radioactive waste was seeping from tailings ponds into the groundwater at the Anaconda mill near Grants and the Kerr-McGee mill near Ambrosia Lake, the EPA said. Mine waste water near Gallup "represents a threat to potable groundwater in the vicinity of the Puerco River and possibly part of the Gallup municipal supply . . . (although) at present . . . none of the

groundwater samples contain sufficient radionuclides to constitute a health problem."

Without actually spelling it out, the study implied that the water contamination problem in the Grants mineral belt would get worse as uranium mining and milling continued and increased.

Because of that study, the New Mexico Water Quality Control Commission, on Jan. 11, 1977, established groundwater regulations. All but one of the Grants mineral belt uranium companies filed suit to overturn the regulations. Their brief in the New Mexico Court of Appeals was based on administrative and procedural questions. Nowhere in their brief did the companies say they would not dump radioactive effluents into groundwater.

"The public interest in having a drinking water source which does not constitute a hazard to public health surely outweighs the economic interests of appellants in being allowed to discharge water without the expense of treating it, and without regard to whether it constitutes a hazard to public health," the state replied.

The suit has not been decided yet, and until it is the regulations remain in effect.

The uranium companies also appealed regulations limiting their dumping into surface waters. They objected to provisions in the EPA's National Pollution Discharge Elimination System's (NPDES) permits, and on May 24, 1976, the EPA suspended the regulations as they applied to the uranium companies. The state, not wishing to duplicate what the EPA already was doing, had passed no such laws of its own.

Until the dispute is resolved, then, the uranium companies "in essence are discharging (waste into New Mexico surface waters) without any restrictions," said Jim Stiebing, chief of the Dallas EPA's engineering and evaluation branch. The

(see next page)

A consulting company is inviting the federal government to set a dollars and cents figure on the value of a human life.

drives cattle crazy and sometimes kills them. Ford, Bacon & Davis found that water, usually within the immediate area of the tailings, had been contaminated with concentrations of one or more of these elements — most often selenium — that were sometimes hundreds of times higher than allowed by the EPA's Interim Drinking Water Standards. Only in one or two cases, however, was that water likely to be used for human consumption.

Radium has leached from each of the 22 abandoned piles anywhere from two to nine feet into the subsoil, Ford Bacon & Davis said. The brisk, western winds, too, have not been idle. In many cases, the wind has blown tailings up to half a mile from the piles onto land where livestock and wildlife graze. In a few cases, the wind has carried tailings across rivers and close to buildings.

for the states to take over the functions of the federal government, so MESA now inspects all uranium mines, though the states also can do their own inspecting. The EPA sets radiation standards for mines.

As for mills, the NRC licenses most of them, though a state — in this case called an agreement state — can take over the NRC's role. New Mexico, for example, is an agreement state. Wyoming is not.

In addition, the EPA has overall responsibility for setting radiation standards for air and water, though states can take over those responsibilities provided their standards are at least as stringent as the EPA's. As yet, there are no federal requirements for reclaiming land disturbed by uranium mining and milling. States may — and Wyoming has done this — set their own land reclamation regulations and enforce



Photo by Mike McClure
A URANIUM strip mine threatens the fragile grasses of the semi-arid Rocky Mountain deserts.

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great majority of these discharges are from the mines.

John Dudley, a geohydrologist with NMEIA's water quality division, said state inspectors a few months ago found that relatively high levels of radium, uranium, and selenium were being discharged. "The industry is relatively new. While we haven't seen people dropping over, that isn't to say they aren't being harmed," Dudley said.

Ironically, Dudley said, some companies that protested the ground and surface water regulations have voluntarily installed water treatment systems.

In Wyoming, which produces 31% of the country's uranium, there is little contamination of surface waters because state regulations forbid the dumping of wastes that contain any more radioactivity than allowed by the EPA's drinking water standards, said John Wagner, of the Department of Environmental Quality's (DEQ) water quality division.

In the past, however, uranium operations in Shirley Basin, Wyo., severely polluted a section of the Little Medicine Bow River, which flows into the Medicine Bow River, which flows into the North Platte, which flows into Seminole Reservoir.

Wyoming's Game and Fish Department found that Little Medicine Bow water below the uranium plant had 40 times the radium dissolved solids than water above it, 300 times the uranium, and two times the strontium. Sediment samples in water below the plant contained nine times the radium above it, seven times the lead, 20 times the uranium, and four times the strontium.

The Little Medicine Bow and the Medicine Bow have improved since then, despite intensified uranium production in Shirley Basin, but they still are listed in Wyoming's Water Quality Inventory for 1976 as the only streams in the state fouled by the uranium industry. "Although these water courses are not used as domestic water supplies, their confluence with the North Platte River poses a potential water quality problem in segments of the North Platte that are public water supplies," the inventory reported.

The state has not yet examined its groundwater because it lacks the money and technical expertise, said Wagner. Last November, DEQ hired a hydrologist, so the state soon may know whether it needs to write regulations to protect groundwater, he said.

RADIOACTIVE PLANTS, ANIMALS

In addition to potentially infiltrating human water supplies directly, radioactive materials released by uranium mining and milling can enter the human body indirectly through fish living in contaminated waters, cattle and/or wildlife living on contaminated lands, Argonne National Laboratory said in an environmental impact statement, — the first EIS on uranium production required by the NRC — released in June, 1977, dealing with Rocky Mountain Energy Co.'s Bear Creek operations in Wyoming's Converse County.

The amount of radioactivity ingested by people through contaminated plants and animals, however, would be negligible, Argonne said. The laboratory is further studying this aspect of uranium milling as part of the generic statement it is preparing for NRC. Walt Kisieleski of Argonne said plants and the bodies of animals were being examined, but he was reluctant to discuss his preliminary findings until they were completed.

The EPA, however, in a 1977 report, said, "The use of land for cattle raising around current milling operations could mean that the consumption of meat could

represent a significant pathway for internal (radiation) exposure."

In probably the first study of its kind, Dr. Garth Kennington of the University of Wyoming measured radioactivity in plants and animals near Exxon Co.'s Highland operations in Wyoming. Kennington found that plants growing near the mill contained more radium than plants further away.

He found, too, that jackrabbits, per pound of body weight, had absorbed 26 times more radioactive material than the recommended limits for human beings.

What this means in terms of health hazards, nobody knows, Kennington said. "We don't know if the radiation caused subtle (health) effects, though we do know there were no visible health effects," he said during an interview. "The rabbit populations there seemed to be doing well, and if something harmful is going on, the population usually shows it."

Kennington now is conducting another study that includes deer.

Exxon was asked to comment on Kennington's study and on other aspects of uranium production, but declined to do so.

INSIDE A MILL

Ted Keller, general superintendent of

The country's richest ore and its most intense uranium mining and milling occur in the Grants Mineral Belt in western New Mexico.

Western Nuclear's Jeffrey City, Wyo., operations, and Bob Helm, the mill superintendent, led me through the green metal building, 250 feet long, 100 feet wide, 40 feet high, where the company converts uranium ore to yellowcake, actually a fine black powder.

Past the ore grinder, that looked like two enormous flywheels with a hollow six-foot diameter shaft sticking out of them; past the 50-foot green holding tanks that each held 600 tons of crushed ore; past the 11 smaller leach tanks; past the sulphuric acid tank that mingled its throat-tickling vapors with the musty smell of uranium ore; past the resin-pump circuit where the

dissolved uranium filtered through polymers that looked like wet crushed amber; into a separate solvent extraction room where dissolved uranium mixed with kerosene steamed in three rectangular tanks; past the thickener; past the centrifuge; into the yellowcake drying room where the workers wore respirators and the concrete floor was wet from the continual effort to reduce dust that radon daughters adhere to.

"We've got 56 sites in here where we monitor for radiation, and 24 where we look for radon," said Helm. "It's usually between .02 and .11 working levels. We've got scrubbers in the stacks to clean discharges. We've got air monitoring stations at the perimeter. There's no significant off-site radiation. It's near background all around the mill."

"We've got monitoring wells all around the mill and tailings pond. They go almost to the Sweetwater River a mile away, and we look at the water in Jeffrey City. We're not polluting the ground water or the surface water."

"In the old days," said Paul Blair, the company's resident manager, "the Atomic Energy Commission was all we had to deal with. Now, with the establishment of

tailings. We're not objecting to stabilizing them. But we want to keep a flexible approach so that, by the time we're through here, if technology has come up with a cheaper and better way of stabilizing, we can use it."

"All these new regulations have added to our production costs. I don't know exactly how much, but certainly considerably."

The NRC for years has required constant monitoring and inspection of uranium mills. But, with the passage of the National Environmental Policy Act and under prodding by the Natural Resources Defense Council, the agency recently clamped down even more tightly. Now, it demands liners in tailings ponds and an environmental impact statement before it licenses a new uranium mill.

"There's no significant amount of radon going from the miners to Jeffrey City," Blair said. "We sample the immediate area. Dispersion and the volume of the exhaust make radon levels negligible outside the mine. We calculate how much radiation each worker is exposed to. If it's getting close to regulatory limits, we transfer him to another job for a while."

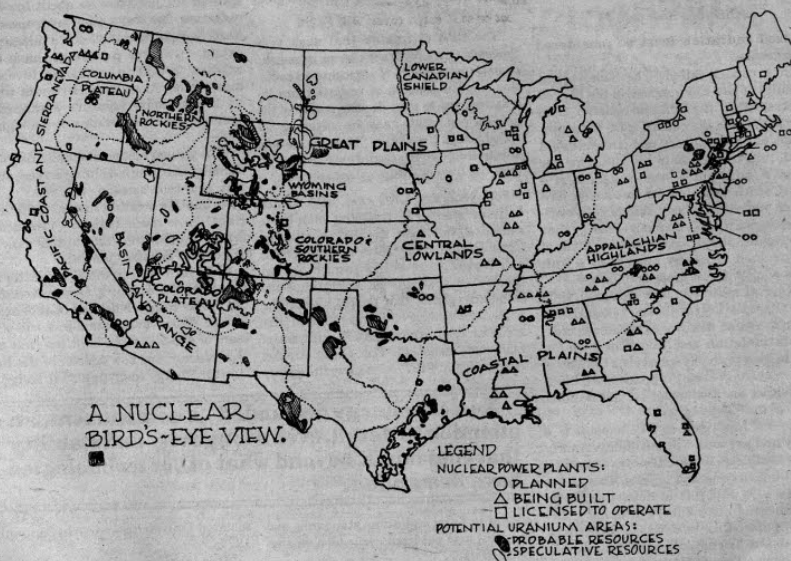
"Many state and federal regulations," said Keller, "originated with programs the industry already was conducting. If a company had a particular safety program and the NRC found out about it, pretty soon they'd pass a regulation or issue a guideline suggesting that all uranium operators do the same thing. New Mexico's mining law came right out of company rulebooks."

NATURAL RADIATION

"To look at the situation in perspective, you've got to look at natural radiation, and compare it to what we're adding. The uranium industry adds almost nothing."

Almost nothing, however, is not the same as nothing. Dr. Robert Pohl of Cornell and others argue. Pohl calculates that the uranium industry might add one per cent to the radiation that naturally exists. The EPA's calculation is lower.

The important point, Pohl says, is that since no one has found a level of radiation that is harmless, then any amount of man-



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caused radiation must be considered hazardous.

In a report called "The Radiological Quality of the Environment in the United States, 1977," the EPA said radiation from the sun, from the earth's crust, from concrete buildings, from non-contaminated food, ranges from 40 to 240 millirems per year. A millirem — one-thousandth of a rem, which is a unit for measuring how much radiation a body absorbs — constitutes such a minute quantity of energy that to visualize it one has to think in terms of the amount of energy released by a fruit fly's wing when it drops half-an-inch.

Natural radiation, it is estimated, kills 4,000 people a year in the United States from the same diseases as man-made radiation; radiation resulting from uranium production probably kills only a fraction of one per cent of that. Figures for both kinds of deaths are mathematical calculations, rather than body counts.

No one has yet been able to point to a body and say with any scientific certainty that death due to radiation was caused by uranium mining and milling. That is because it is difficult to determine, first, whether radiation killed a man, and virtually impossible, second, to determine whether it was natural radiation, or radiation emanating from a tailings pile miles away.

"Unnecessary radiation should be avoided," said Paul Smith, regional representative for the EPA's Office of Radiation Programs in Denver. "What to me characterizes the danger (of uranium production) is that the radiation it leaves is going to be a legacy to our children and their children and their children."

"I like to think we're coming to grips with the problems. By and large, the new companies are doing a good job. They're willing to go through an additional expense to assure that tailings are under control. But I think the situation also requires vigilance."

The General Accounting Office,

Congress's watchdog, in January questioned EPA's past vigilance in protecting the public from radiation, and urged greater vigilance.

"The EPA estimates that each year thousands may contract cancer or genetic diseases as a result of exposure to radiation. . . . The sources of radiation are increasing, and as they do, the health of the general population may be adversely affected," said the GAO. "Because genetic effects are involved, radiation exposure affects the lives of future generations."

Four years ago, GAO said, EPA wanted to issue standards limiting man-made radiation, but both the Atomic Energy Commission and the Office of Management and Budget successfully argued against them. Last year, the EPA did issue the standards, saying that people outside the immediate vicinity of a uranium mill may not be exposed to more than 25 millirems of man-made radiation. The Clean Air Act Amendments of 1977 also gave the agency

troller of the Department of Energy, told GAO in a Sept. 30, 1977, letter, that, "In spite of the uncertainties about low-level radiation, few, if any, other environmental hazards have been studied to a comparable extent. . . . Large populations have been exposed to differing radiation levels for many generations with no results which, by the ordinary layman's standards of common-sense observation, seem significant. . . ."

"The primary issue in establishing standards at this time is defining an acceptable risk, and then assessing this risk."

No one disputes that natural radiation is risky. How much radiation released by uranium production adds to that risk is a vigorously debated question.

Alvin M. Weinberg thinks the latter risk is acceptable. Weinberg, former director of the Oak Ridge National Laboratory, former White House consultant, one of the team of scientists who built the first nuclear reactor, and now director of the Institute for Energy Analysis at Oak Ridge As-

Nuclear energy demanded "a commitment, an attention to detail, even a longevity and stability that goes much beyond what other technologies have demanded."

authority to set radiation standards, and the EPA may put limits on radon emanations by 1980.

Still, "National Council on Radiation Protection and Measurements officials said that EPA's radiation protection guidance role has been a disaster because of its limited staff and money," the GAO said.

"EPA admits that it does not know the entire scope of the radiation danger, that it does not have the resources to find out, and that its limited staff (the Office of Radiation Programs is the least funded of all EPA programs) is unable to develop all the needed standards and guidance simultaneously. . . . The future ability of EPA's radiation protection program remains in question."

Disagreeing with some GAO conclusions, Fred L. Hiser, assistant to the con-

sociated Universities, wrote in September 1977:

"This (nuclear) energy source demanded from mankind a commitment, an attention to detail, even a longevity and stability that went much beyond what other technologies have demanded. Was man up to this responsibility? Goethe's Faust was: he was redeemed. . . ."

"I cannot prove that man will be as successful as was Goethe's Faust. But we have few choices in the matter of energy. For me, man has no choice but to explore the possibilities. . . . His responsibilities and his fears must not be allowed to shatter his dreams."

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Uranium supplies face rising demand

Copyright 1978
by Justus Bavarskis

On facing pages of the Department of Energy's "Statistical Data of the Uranium Industry" for 1977, two graphs stare at each other like a cat and a rat in an alley.

One climbs steeply, and shows that the amount of uranium ore milled each day in the United States jumped from slightly less than 13,000 tons in 1966 to slightly more than 24,000 tons in 1976. The other plummets. It shows that the average amount of uranium oxide in the ore slid from 0.23% in 1966 to 0.15% a decade later.

Taken together, what the two graphs mean is this: to produce the same amount of uranium oxide as 10 years ago, it is now necessary to process millions more tons of earth each year, and it costs more to do it.

The graphs explain why, in part, the price of uranium needed to fuel nuclear reactors has shot up in recent years. They also explain why, within the not too distant future when the price of uranium reaches the right level, the bulldozers and earth scrapers and front-end loaders and mills may move to the rich farmlands of Tennessee, Kentucky, Alabama, and Georgia to get at the Chattanooga shale, which bears twice as much uranium, of a very low grade, than the rest of the country's resources combined.

Finally, the graphs could conceivably mean that, if the technology is perfected and the need still alleged, energy developers may eventually distill uranium from seawater, where an estimated 4.2 billions tons of it is tossed about.

The Chattanooga shale is a possibility, rather than a probability. As for seawater,

Uranium is moody, erratic. For the most part it prefers to fraternize with sandstone.

that is a remote possibility. Yet, that their uranium content has been analyzed demonstrates how assiduously the search for uranium is pursued.

In the 1960s, once the Atomic Energy Commission had stockpiled enough uranium for bomb-making, the U.S. committed itself to producing electricity through nuclear power. The type of nuclear reactor it chose was the light water reactor (LWR), because this was the type used by nuclear submarines, and because the LWR could employ uranium left over from the atomic bomb program.

The flaw was that the LWR is the least efficient of all reactors. It wastes about one-third of the uranium it burns.

For years, scientists have been trying to develop a breeder reactor, which, as it burns uranium, produces far more plutonium than the LWR. In a breeder, the plutonium can then be used as a part of the fuel. But no one as yet has been able to persuade a breeder reactor to perform as it is supposed to. President Jimmy Carter, fearing the breeder's plutonium may be used for warfare, cut government funds for the project although he is still evaluating the option of alternative breeders that don't use plutonium.

Carter also opted against recycling spent reactor fuel. Those decisions mean that between 20 and 30% more uranium is needed to supply the LWR's than would be needed if spent fuel was recycled, and if breeder reactors replaced LWRs.

"No matter how one analyzes the energy future, it is quite clear that nuclear power must play a substantial role," R. W. Bown, of the Department of Energy's Policy and Evaluation branch, told the annual uranium industry seminar at Grand Junction, Colo., last October.

"The Administration is supporting programs to ensure that LWR's continue to be a major contributor to our energy needs. As a part of this fuel cycle activity, a strong and competitive uranium industry must be maintained," Bown said.

(continued on page 12)

Green Mountain, Wyo.

Impacts: uranium

Copyright 1978

by Justus Bavarskis

The body of a doe antelope, eyes glassy, tongue hanging out, lay on its side in snow and sagebrush beside the new dirt road. "There," said Harold Crosswell, braking his pickup truck. "That's a good example of how uranium development affects wildlife."

"This used to be free range for her," he said. "But the uranium companies built this road. So now antelope are getting hit."

Crosswell (not his real name; he asked that his real name not be used "because I



Photo by Mary Trigg

BEULAH PETERSON WALKER used to read adventure stories to cowpunchers. But that was before the uranium company came to town.

have to live here"), a veteran resident of the area, had agreed to show me around Green Mountain on the northern edge of Wyoming's Red Desert, and to explain how he felt about uranium activities there.

Western Nuclear began mining uranium from the Green Mountain-Sheep Mountain-Crooks Gap region in 1956, and now is operating six underground mines, two open pit mines, a mill, and the town of Jeffrey City. Utah International recently started mining there. Both companies, and a host of others, have been looking for uranium along the entire length and breadth of the Red Desert.

Uranium activity has been so intense in recent years that old-timers half-jokingly mutter about Green Mountain becoming Green Pit 20 years from now.

"I guess money really talks," said Crosswell. "You listen to the governor and the ex-governor and the legislators and they all say they're out to preserve the Wyoming way of life. Seems to me the Wyoming way of life now is to make the all-mighty dollar. They're preserving that all right."

The way of life was simpler on April 5, 1931, when Beulah Peterson Walker, her husband, and their two children moved from Nebraska to the plains under Green Mountain, built a log house, opened a gas station-cum-post office, and called it Home on the Range.

Jeffrey City was not even a gleam in anybody's eye then. Apart from a few ranchers and homesteaders, the area's only inhabitants were elk, mule deer, and antelope; skunks, coyotes, and bobcats; rodents, birds, and insects.

Now an active, grey-haired lady in her 60s, with quick blue eyes behind thick glasses, Walker sat in an armchair in her scrupulously clean living room, next to a miniature organ that wore a placard proclaiming "It's a Grand Night to Sing."

"This uranium operation has changed a

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uranium mines and mills move more than mountains

whole style of living," she said. "If I were to tell you what I really thought of it, why, it wouldn't be printable."

"Before they built Jeffrey City, you looked at anybody who came to your home as a friend. You didn't question their integrity in any way, shape, or form. You shared whatever you had with them. You treated them as good people until they proved otherwise."

"There was no radio and no TV in those days. We provided all our own entertainment. I found out the cowpunchers liked adventure stories, and a lot of them couldn't read so I'd go to the library and get books. I'd read till I got hoarse. Sometimes, they'd argue over what the stories were about."

"We used to go to town for groceries maybe once every three months. Now we've got a school and a bank and a grocery store. They make things a lot more convenient."

"But when we didn't have them, we didn't miss them."

"There used to be so much antelope and sage chicken and deer around here. We used to have antelope and sage grouse for pets. In winter, when a herd of antelope crossed the road, they looked like a cream-colored cloud. You'd look out and see antelope in every direction. Now you're lucky if you see any in a week."

"Wildlife are smart," said Bob Peterson, Jeffrey City warden for the state Game and Fish Department. "They won't stay where there's a lot of noise and activity." There are fewer antelope than there used to be, he said, and the deer population, too, has declined, partly because they've lost habitat to the uranium industry and partly because the Green Mountain herd is on the downbeat of its population cycle.

Last spring, however, the department counted 458 elk on Green Mountain, more than ever had been counted there.

Apart from the loss of habitat, increased hunting, both legal and illegal, is taking its toll of game. "Last summer, there were camper trailers parked all up and down Crooks Creek," Peterson said. "I found one spot with two antelope and 70 sage grouse carcasses all piled up. God knows how many dead sage grouse there are out there. These new guys come in to work in the mines and they've never seen wildlife like you have out here. They just can't stand not to shoot something. After a while they calm down, though."

The Bureau of Land Management says exploration for uranium has left 800 miles of roads on Green Mountain so far. From a distance, the roads look like spider webs on the hillsides. A procession of mounds, each taking up perhaps half an acre, marches south from Green Mountain 60 miles across the Red Desert to Wamsutter, and west more than 40 miles across Bison Basin and Antelope Hills, both prime antelope habitat. The mounds were left by uranium drillers.

Federal law has no requirements for reclaiming land disturbed by such exploration, and state law requires reclamation only when bulldozers were used.

Until 1969, the uranium industry, operating under the federal 1872 mining law, was under no obligation to reclaim anything. That year, Wyoming passed a mild mining act that demanded at least lip service to the principle of reclamation. In 1973, it passed the Environmental Quality Act, but specific rules for reclamation were not drawn up until the summer of 1975.

Between the time the law was passed and the regulations set down, the Depart-

ment of Environmental Quality (DEQ), with a limited staff and equally limited funds, found itself with 200 industrial applications to process, many of them for uranium operations. "It turned out to be a rubber stamping process," said Gary Beach, a soil scientist in DEQ's Land Quality Division.

DEQ slowly is reviewing the old applications. Whenever a uranium (or other) company applies to expand or change its operations, DEQ says it fights to insert a clause in the new permit that would require full reclamation of land it disturbed when either no, or minimal, reclamation was required.

"Some companies are doing some voluntary reclamation," Beach said. "But there's not very much of that." However, under the 1977 Federal Strip Mining Act, he said the companies pay a 35-cent tax on the dollar, and half of that returns to the state where the mineral came from. The state can use that money for reclaiming abandoned mines and tailings piles, he said.

"We've found that the companies do better if you try to work with them rather than against them," he said. "Leave them with some responsibilities and you get more voluntary work out of them."

"These people live the economics of mining," Beach said. "We've got to teach them to appreciate environmental concerns. They're more responsible than they used to be."



UNTIL WESTERN NUCLEAR began uranium production in the area, Jeffrey City, Wyo., was known as Home on the Range and consisted of little more than this cabin.

On the south side of Green Mountain, Crosswell and I worked to free his truck from a snowdrift. A pair of golden eagles hunted overhead. "Under the 1872 mining law," he said, "the companies can patent (get title to) the land by virtue of working it. So when they're through with it, are they going to keep it, or sell it, or return it to the public?"

"If you're converting public land to private land, I think it's a rip-off. This area here" — he waved his hand in the general direction of the mountain, the desert, and the eagles — "this is the environmental rip-off zone."

Crosswell said, "You've got a collection of trailer courts and cracker boxes back there in Jeffrey City. And the old-timers keep complaining about the new people coming in. There are 3,000 there now, and they say it'll get up to 8,000 by 1980. But when you pin these old-timers down, they'd have to tell you they're for uranium development."

"They're getting jobs now as welders at the mines for \$24 an hour. That's a lot better than they did punching cows. There's talk of lots in town selling for \$10,000 each. Somebody besides the com-

panies stands to make money."

"Me, I can see all this activity is hurting wildlife. And you can ask if all this energy is really necessary. But I like to be able to turn the lights on when I get up in the morning."

We had dug the snow away, and put chains on the tires. "There's a real pretty little place on Wild Horse Point," said Crosswell as the truck jolted along. "It's a rolling spot, with beaver ponds and nice timber. A guy ought to put a uranium claim up there and patent it and do nothing more with it. I'd like to do that. Trouble is, one of the companies already has a claim right in the middle of it."

"Green Mountain won't exist 20 years from now. A while ago, there was a big rig up on top. A joint venture with Western Nuclear and Utah International and Atlantic Richfield. One guy told me they drilled 7,153 feet down and found uranium all the way."

A PUBLIC SERVICE

Paul Blair, resident manager of Western Nuclear's Jeffrey City operations, sat at his office desk and look slightly wistful when asked about the 7,153 feet of uranium.

"That's a geologic impossibility," he said. He smiled. "I wish it was true."

Blair, like other executives in the uranium industry, believes he is performing a public service by producing energy. He expresses as much concern for the land

reclaim that area over there," a patch of bare, brownish-gray earth.

"It's an added cost to reclaim. But if you don't reclaim, then you're tearing up the land unnecessarily. We're not required to reclaim exploration roads, but we'll probably reclaim some of them. Keep in mind that mining companies aren't the only ones building roads. BLM has built roads elsewhere that don't go anywhere."

In Wyoming, DEQ requires that reclaimed land should be as good as, or better than, its original condition. "Certainly, I think an effort should be made to do that," said Keller. "But I've seen a lot of mining areas that restored themselves. I can show you an area in Idaho that was worked extensively for copper by the underground method in the late 1800s. I defy anyone to find much sign of that activity there now."

"I think the uranium industry will try to reclaim without the requirement to do so, to a certain extent," he said. How much that will be done, said Keller, will depend to a large degree on a company's financial picture. For example, Western Nuclear already has reclaimed some land in Wyoming's Gas Hills that it was not obliged to, he said, though he acknowledged that it has not restored an open pit mine there.

From the underground mining area, Keller drove past piles of earth marked with "Top Soil" signs to the Snowball-McIntosh open pit mine, 430 yards long, 330 yards wide, 250 feet deep. On the way, he pointed out the vanishing traces of an old road on the desert beneath us. "We reclaimed that," he said. "We didn't have to."

Last year, he said, Western Nuclear reclaimed 50 acres, some of them voluntarily. Its permit embraces 3,000 acres, and "I'd guess most of the disturbed area will be reclaimed," he said.

At the open pit mine, we transferred to a truck driven by Dale Morton, pit superintendent. Driving further up the mountain, Morton talked about some of his difficulties with DEQ. "They've got minimum requirements for topsoil, say, in reclaiming," he said. "They want a minimum of six inches of topsoil. What are we supposed to do when we go into an area where there's no topsoil?"

"One day, a DEQ guy came in and told us he wanted a spoil pile flattened and smoothed out. Another DEQ guy came a little later and said he wanted it mounded."

"That knoll over there" — we were driving past a knob with boulders and a scattering of limber pines — "we're leaving it as a show and tell area. After we're through here, we want to see if anyone can tell the difference between that and the land we've been working around it."

The Wyoming Water Quality Inventory for 1976 says that high radioactivity levels occur in Crooks Creek, which flows through Western Nuclear's mining operations, and that the radioactivity may be caused partly by the mining. "We've got records going back to 1963 that show the radioactivity levels are pretty much the same upstream from our operations as they are downstream," Blair said.

"We believe this whole area," said Keller, "will support plant life better after we're through than it did before."

"And look at Jeffrey City. We've provided schools, ambulances, medical services, jobs, a grocery store, a bank. The people here are reaping the benefits of industry."

"What we're doing is necessary," said Blair, "if people want to keep up their standard of living." ◆

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ALLEN ROWLAND



**The HCN
Hot Line**

energy news from across the country

AMENDED SLURRY BILL. Still a long way from passage, coal slurry pipeline legislation has made it over a major hurdle in the House. On Feb. 22 the House Interior Committee approved the bill and passed it on to the Public Works Committee. The bill was amended by Rep. Dan Marriott (R-Utah) to insure state authority over slurry projects. Rep. Teno Roncalio (D-Wyo.) added an amendment requiring U.S. Geological Survey assurance that the proposed use of groundwater would not adversely affect the water table in the area or in neighboring states. To avoid conflicts with railroads, the legislation gives the government the authority to grant a right-of-way for slurry pipelines crossing private land.

PHASE TWO. "Phase two" of the Carter Administration energy program is emerging, even though phase one is still mired in congressional indecision. Phase two will emphasize production, rather than conservation, of energy. It is aimed at producing 2.5 million barrels of synthetic fuels daily by the late 1980s. Secretary of Energy James R. Schlesinger outlined the plan in late February at a businessmen's convention in Washington, D.C. Although details are not clear, environmentalists are skeptical. "To talk about supply without having made firm and legal commitments to energy conservation opens the door to all kinds of mischief," says a spokesman for the National Wildlife Federation.

COAL LEASING MAY RESUME. Limited coal leasing on federal lands may resume if an agreement made by environmentalists and the Department of Interior is approved by a U.S. district judge. The pact provides for leasing "enough coal to keep Western mines from closing, allow operators to fulfill existing contracts, and prevent the loss of federal coal (by allowing mining of federal coal surrounded by private coal)," according to Secretary of Interior Cecil Andrus. Full scale leasing was stopped by a court injunction in the case of *NRDC v. Hughes* in September, pending the Interior Department's completion of a final environmental impact statement on coal leasing. The new agreement would allow for the sale of about 35 leases that could not otherwise have been sold, according to the Interior Department.

Colstrip 3 & 4 mired in confusion

by Dan Whipple and
Jonny Lerner

Colstrip power plant units 3 and 4, which not long ago were about to go under construction, have now run into major roadblocks. A state court decision and a lawsuit may force the plants to comply with certain provisions of the new Clean Air Act Amendments and result in additional construction delays and expenses. A power company official says the project may ever be cancelled.

The first development is a district court decision that the state must rescind the plants' construction permits, issued by the state board of health and the board of natural resources, and hold another hearing on the permit. In a ruling on March 3, state District Court Judge Gordon Bennett ruled that the state boards' decision to issue the permit was "procedurally formally defective." The judge also said that the hearing itself was a "procedural travesty."

Montana Power Company (MPC), the lead company in a five-utility consortium building the power plants, reacted swiftly. MPC president Joseph McElwain told the Associated Press that the \$1 billion power project probably would be cancelled unless the Montana Supreme Court overturns Judge Bennett's decision. McElwain said that, without the permit, which was issued in July 1976, the plants would be subject to the new Clean Air Act permit procedures, which could cause another two or three years of review.

He said, "Under those circumstances, we may as well kiss the project goodbye and prepare the people of Montana to go on a starvation energy diet. Without Colstrip 3 and 4, we can forget about economic growth, about creating new jobs, about expanding agricultural production, about all the sound, healthy economic development Montana needs so desperately."

One of the appellants in the case against the construction permit is the Northern Cheyenne Indian tribe. The tribe has designated the air on its reservation as Class I under the Clean Air Act. A Class I designation allows little or no deterioration of air quality. The tribe feels that construction of the power plants will result in violations of its air quality and has opposed the plants for years. Northern Cheyenne Tribal Council Chairman Allen Rowland called McElwain's assessment of the situation "ridiculous and outlandish." Rowland says that the statements "are a good indication of the irresponsibility of that company."

Rowland also scoffed at McElwain's dire

predictions for economic disaster for the state of Montana. MPC is the only Montana utility participating in the Colstrip project. The other four are located in Oregon and Washington. Rowland said, "It's about time this state quit acting like a damn colony. We've been listening to MPC tell us about our business for too long. They're supplying Washington and Oregon, not Montana, with power."

In his ruling, Bennett ordered the board of health to consider whether less environmental impact would result from building power plants closer to the point of use of the electricity, or by building a mine-mouth plant and sending electricity through transmission lines. He also ordered the board to examine the energy costs of both methods, not just their economic costs.

MPC will appeal the ruling and is asking for a swift decision from the state supreme court.

The project had already been held up by a suit to determine whether the U.S. Environmental Protection Agency (EPA) had properly interpreted its legislative mandate from the Clean Air Act Amendments of 1977 to require best available control technology (BACT) on new power plants.

EPA had determined administratively that the effective date for requiring BACT on new plants would be March 1, 1978, meaning that the more stringent pollution control requirements would be required only for facilities issued air permits after that date. A lawsuit filed in U.S. District Court in Washington, D.C., by the Environmental Defense Fund (EDF) argues that the effective date of the BACT requirement should be the date the President signed the bill — Aug. 7, 1977.

EDF, an environmental group, claims

that EPA was illegally allowing several facilities, perhaps as many as 60, to escape meeting the tougher new provisions of this section of the Clean Air Act.

The court made no immediate decision on the EDF suit, but EPA agreed not to issue any further air permits until the suit is resolved. EPA did say, however, that it would continue to process permits as though it intended to issue them before March 1, and that if their deadline was upheld eventually, these facilities would be protected. Colstrip was one of the units due to receive the air permit before the March 1 deadline.

If the EDF suit is lost, and if EPA grants Montana Power's permit request, a legal challenge by the Northern Cheyenne is likely. They would charge that suspension of the March 1 effective date was selective and that it denied them due process and appeal rights under PSD procedures. "We are not against development," says the tribe's vice chairman, Joe Bear, "but we know they could meet that clean air requirement." Threatened by coal company plans on all sides of their small reservation, the Indians feel they have no choice but to fight for its protection.

If the plant is built, the tribe has one other legal option. Tribes or states with Class I status are empowered, under a section of the PSD provisions known as 164(e), to make an independent finding of air quality violations. They can then require EPA to set up direct negotiations between themselves and the offending industry, as a means to avoid further polluting incidents. But the Northern Cheyenne are the first to achieve Class I redesignation, and like a good part of the PSD rules, use of that right remains uncharted ground.



NORTHERN CHEYENNE RESERVATION. The tribe fears that Colstrip power plant units 3 and 4 will pollute the reservation's air.

DOE identifies RARE II energy conflicts

The Department of Energy (DOE) has identified about 25 million acres of land covered by the second Roadless Area Review and Evaluation (RARE II) that the agency considers to be of "major interest" for energy development. The acreage represents almost 40% of all lands identified by the RARE II inventory, which totaled 65.7 million acres nationwide.

In a cover letter to Assistant Agriculture Secretary Rupert Cutler, accompanying the DOE report on energy resource assessments on RARE II lands, DOE Assistant Secretary for Policy and Evaluation Alvin Alm said, "We have identified a total of 588 tracts which we regard as either 'very important' or 'important' for energy development purposes. As a general rule, we recommend that these tracts not be included in wilderness designation proposals."

According to the report, the largest and most critical overlap between roadless

areas and energy potential is with oil and gas lands. Of the 588 critical tracts, 341 were ranked "very important" or "important" for oil and gas. Critical acres totaled about 14 million.

DOE says that about half of the high value oil and gas tracts are in Forest Service Region 4, which covers Utah, Nevada, southern Idaho, and western Wyoming. DOE says that the Overthrust Belt, which runs from Utah through western Wyoming and into Idaho, "offers the best potential for new onshore oil and gas discovery and production in the lower 48 states . . . The Idaho-Wyoming portion contains approximately 8.9 million acres, about 20% (1.8 million) of which is RARE II acreage. All of the 1.8 million acres are classified as very important."

The other major conflict between roadless lands and energy concerned hydroelectric potential. DOE says that "158 tracts

were identified as being of interest from a hydro point of view." However, the report says that 55 of these were of interest because a wilderness designation of the roadless tract would conflict with the operation or maintenance of hydro facilities which are either in existence or under construction.

In addition, the DOE report identifies lands which could affect hydroelectric projects for which regulatory proceedings have already begun or been proposed. A total of 9.2 million acres were classified as either "very important" or "important" for hydroelectric potential.

The DOE also reviewed possible conflicts between roadless areas and coal and uranium resources, but conflicts were minimal, the report says. Only 3.2% of "probable" uranium resources are within RARE II lands and only 1.2% of the U.S. coal reserve base is on roadless lands.

Suit to test reclamation requirement



The National Indian Youth Council (NIYC) and 13 residents of the Navajo community of Burnham, N.M., have filed a lawsuit in U.S. District Court in Washington, D.C., to halt strip mining activities that they say will cause irreversible damage to the Navajo lifestyle, land, air, and water.

The suit is against a lease granted by the Navajo Tribe to CONPASO, a joint venture by Consolidation Coal Co. and El Paso Natural Gas Co. John Redhouse, a Navajo and the associate director of NIYC, says he thinks it is the first suit filed since the federal strip mining bill was passed last year that will test the reclamation requirements in the law.

The plaintiffs say reclamation is not possible in the area of the lease, primarily because of low rainfall. They quote a National Academy of Sciences report that says reclamation is impossible in areas that receive less than 10 inches of rainfall each year. The area of the lease averages seven inches annually.

The federal strip mining law says mining is allowable only where reclamation is possible. "If this suit is successful, it could affect much of Western coal development," Redhouse says, because rainfall is low — and thus reclamation is difficult or impossible — in much of the West.

The suit also charges that the federal government violated the National Environmental Policy Act and two acts regarding historic and archeological preservation. Indian people have occupied northwestern New Mexico for more than 12,000 years, but the NIYC charges that there has not been a complete inventory of archeological remains in the lease area.

Presently, more than 200 Navajo people dry farm and raise sheep on the proposed mine site. All will have to be relocated and to adjust to a different lifestyle, NIYC says.

A representative of CONPASO says the companies will relocate the people at its own expense. They anticipate no problems with reclamation, saying the companies can get all the water they need from their river water rights and from wells.

The plaintiffs in the suit argue that the groundwater wells will have to be thousands of feet deep, may be contaminated with natural radiation, and may have a serious, long-term effect on water tables.

CONPASO had been negotiating for

more than three years for the lease when it was turned down last summer by Interior Secretary Cecil Andrus who said the royalty returns to the tribe were too low. After the royalty rate was raised to 12.5% — the same as federal royalties — Andrus approved the lease Aug. 31. More than 670 million tons of strippable coal are involved on the 40,000 acre lease.

Already in the vicinity are two power plants, three major coal leases, and a uranium lease. When announcing the suit, Redhouse noted that Indian people sit on about one-third of the nation's low sulfur strippable coal reserves. He said, "When President Carter referred to the implementation of his national energy policy as the moral equivalent of war, we knew then that the Indian wars were not yet over and that we must do battle with the bureaucratic cavalry and the corporate cavalry in order to protect our land, our way of life, and our future as Indian people. Today, the fight has begun."

First coal lease draws fire

The first federal coal lease in the country issued since a court-ordered moratorium in September was "the worst example we've even seen of a bureau just totally botching things — ignoring laws, citizens, and other agencies," according to a Colorado environmentalist.

The environmentalist, Brad Klafehn of the Colorado Open Space Council Mining Workshop, claims that in handling the lease sale, the U.S. Bureau of Land Management has violated the Federal Coal Leasing Amendments Act and the Bald Eagle Protection Act of 1940. A bureau spokesman argues that neither of the statutes were violated.

The bureau sold the lease Feb. 22 to Colorado Westmoreland Inc. Westmoreland has just finished mining privately owned coal near Paonia, Colo., and has been seeking a lease on adjacent publicly owned coal for several months. Although in September a Washington court called for a moratorium on coal leasing, it also provided for three-year leases to existing operators.

A golden eagle nesting site is 1,000 feet from Westmoreland's underground mine portal. The Bald Eagle Protection Act makes disturbing golden eagles a criminal offense. Even after warnings from the U.S.



energy news of the Rockies and Great Plains

MONTANA LEASES INVALID? A coal lease held by Westmoreland Resources Inc. should be declared invalid because it doesn't bring a fair return to the state of Montana, says Ed Dobson of Friends of the Earth. Furthermore, Dobson says, all other state coal leases should be rescinded and renegotiated at the 12½% federal coal royalty rate. Westmoreland is paying the state 17½ cents per ton, regardless of the sale price of the coal. Dobson recently took his group's case before the state land board, not because he thinks the board will agree with him, but to "exhaust our administrative appeals before litigation," he said in an Associated Press story.

TRASH IS GAS SUBSTITUTE. A trash burner supplemented by a coal burner may soon be used to heat and cool Wyoming's state office buildings in Cheyenne. The state facilities are currently heated by a boiler fueled with natural gas, "which may not be available to us much longer," says Kirk Coulter, director of the state Department of Administration and Fiscal Control. The department's budget proposal for the next two years includes \$360,000 for a feasibility study and initial funding of the trash-coal project. Coulter says the state's five buildings could be served by single power plant burning trash around the clock to produce either steam heat or cool air for the offices.

GASIFICATION ON THE SHELF. Federal loan guarantees will probably be too slow in coming to help ANG Coal Gasification Co.'s \$900 million project, company officials say. ANG is hoping to build a demonstration coal gasification plant in Mercer County, N.D. The Department of Energy (DOE) appropriation bill signed by President Carter at the end of

Fish and Wildlife Service, the bureau refused to postpone the lease sale to resolve the issue, according to Klafehn.

"The eagles and the mine are getting along," says Kip Hinton, public affairs director for the bureau's Colorado office. He says the nest is over a ridge from the mine. Last year the golden eagles nested and raised young, apparently undisturbed by mining activities, he says. The lease sale will expand Westmoreland's mine, but is not expected to change activities at the portal.

In addition, Klafehn says the bureau has refused to hold a public hearing that is required by the Federal Coal Leasing Amendments Act. The bureau says that a public hearing is not necessarily required.

Mark Welsh, leader of a Hotchkiss, Colo., group that opposed the sale, says that one bureau stipulation calls for the company's consent before any additional conditions are imposed. "Literally this is a stipulation to end all stipulations," he says. He says that the complaints of his group, the North Fork Citizens Council, have been ignored by the bureau.

Hinton says that a public meeting will be held March 16 on Westmoreland's mining plan. It will be in Paonia from 7 p.m. to 10 p.m.

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February authorizes the agency to provide guarantees for a demonstration gasification plant. But ANG says it probably can't afford to wait for DOE to act. "We're looking at the strong possibility of shelving the project," said a company official in an Associated Press story.

UTAH POWER PLANT PROPOSED. Utah Resources International, Inc. and Phelps Dodge Corp. have filed an application to build a 400 megawatt power plant near Escalante in Garfield County, Utah, according to the *Deseret News*. The sponsors of the project are studying a site about 10 miles south of Escalante near Carcass Canyon. Environmental studies are now getting under way, and the two companies reportedly have about 70,000 acres of state coal leases that would supply the mine mouth plant. Former Utah Gov. Calvin Rampton, attorney for the two companies, says that the size of the plant and the prevailing wind patterns at the site indicate that it could meet current air quality standards for the area.

COLO. POWER PLANT UNCERTAIN. The Golden Triangle Review reports it is unlikely that the Platte River Power Authority (PRPA) and the Public Service Co. will cooperate on a joint 1,000 megawatt power plant in southern Colorado. A PRPA spokesman said the company had considered the joint venture as a way to get additional power and to delay construction by two or three years of a proposed plant in northern Colorado, known as the Rawhide plant. However, the joint venture is reportedly too far from PRPA's load center to interest the company. PRPA is a power wholesaler owned by the cities of Fort Collins, Longmont, Estes Park, and Loveland in northern Colorado.

UTAH PONDERS NUCLEAR CENTER. Green River, Utah, is listed among the prime sites in the West for a 6,000 to 18,000 megawatt nuclear power generating complex. U.S. Department of Energy officials say that a cluster of 1,000 megawatt generating units could have economic, security, and environmental advantages over scattered, smaller power plants. The agency is offering money for feasibility studies to states with prime sites for "nuclear energy centers," as identified in a 1977 study prepared by Dames and Moore for the Western Interstate Nuclear Board. According to Jim Butler of the Utah Energy Office, none of the utilities in the Western states outside of California, think they could afford such a project, "but they think that a study might be worthwhile for someone later on." The Utah Energy Conservation and Development Council will decide this week whether to apply for funds to do an in-depth study.



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Supplies. . .

(continued from page 8)

A few figures will show how strong the uranium industry is now, and how strong it expects to become by the year 2000. The most conservative estimates were in the National Energy Plan (NEP), which Carter sent to Congress last April.

According to those figures, the nation consumed 530 gigawatts (a gigawatt is one-million kilowatts) of electricity in 1976. Nuclear power accounted for 42 gigawatts, or almost eight per cent of that. If NEP is implemented, the nation is expected to use 700 gigawatts of electricity in 1985, and 1,200 at the turn of the century. Without NEP, the projection is for 750 gigawatts in 1985, and 1,365 fifteen years later.

Nuclear power would provide 18% of the nation's electricity in 1985, and 31% by 2000 if NEP, as proposed by Carter, goes into effect. If it doesn't the percentage figures would change only slightly, though total electricity production would be greater.

In some sections of the country, nuclear power already accounts for most of the electricity produced — as much as 70% in New England.

"Regardless of whether NEP in its present form becomes a reality, energy prices will rise, and conservation will be the order of the day," Bown said. "Nuclear power is expected to maintain economic viability . . . in much of the country and is assumed to retain the confidence of most utilities and the public."

But the economic viability of nuclear power is very much in question now. In 1976, the Atomic Industrial Forum said it costs six mills less to produce one kilowatt hour of electricity through nuclear power than through coal. But last fall, Charles Komanoff, an energy consultant, told a House subcommittee that, largely because of construction costs and "erratic performance," electricity "from nuclear power plants will cost 22% more than electricity from new coal plants."

HOW MUCH URANIUM NEEDED?

If future administrations and congresses, then, espouse Carter's policy toward recycling and the present type of breeder reactor, how much uranium will be needed?

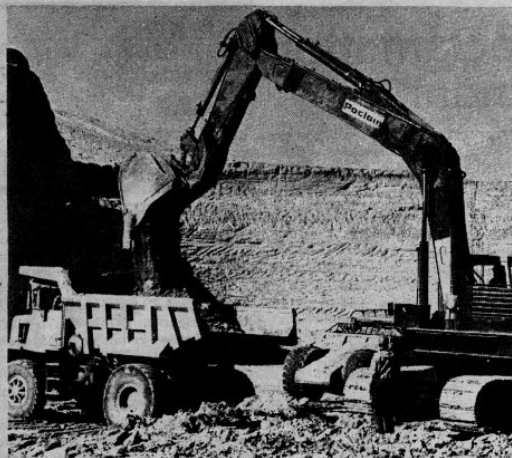
J. Fred Facer, chief of the Department of Energy's (DOE) supply branch, said the uranium industry in the U.S. dug up 10 million tons of ore last year and got 14,000 tons of uranium oxide out of it. In addition, it bought 4,000 tons of oxide from other countries and, by some curious economic logic, sold more than half that amount to yet other nations.

By 1990, DOE estimates 45,000 tons will be needed to fuel the roughly 200 reactors expected to be operating then. Ten years later, according to most estimates, between 90,000 and 100,000 tons of uranium oxide will be needed each year.

Presently, 63 nuclear reactors are producing electricity, the vast majority on the East Coast and in the Midwest. Facer said 200 could be operating by 1990, and 100 more 10 years later. These, DOE estimates, would be producing at least 380 gigawatts of electricity by the year 2000.

To feed the 300 reactors over their 30-year lifetimes, two million tons of uranium oxide would be needed. That could be reduced by 400,000 tons if spent fuel were recycled and if breeder reactors were functioning.

More than two billion tons of ore would have to be mined to produce that amount of



URANIUM ORE is being dumped into a truck at an open pit mine for transportation to the mill.

uranium oxide. There would be enough ore to cover Chicago with a blanket of gray silt more than one foot thick.

Until recently, there was serious doubt whether there was enough uranium to meet those requirements. Facer said there still is some concern, though Lee Busch of Argonne National Laboratories near Chicago is confident the supply is more than adequate. Adequate, that is, to supply the number of reactors presently projected.

But some estimate there may be as many as 700 reactors eventually operating in this country. Whether there is enough uranium to supply them is another question. DOE last year estimated there were 840,000 tons of uranium oxide reserves and another 3.3 million tons of potential resources in the \$50 per pound category. This was the first time DOE had estimated uranium in the \$50 per pound category, doing so because production costs are rising and the quality of ore declining.

\$50 per pound, or \$30 per pound, uranium means it costs that much to produce it. Reserves are uranium known to

Airplanes are flying over every state except Hawaii in search of uranium.

exist. Potential resources means that the uranium probably, possibly, or speculatively exists.

"Prompt and vigorous exploration and development will be required to make new discoveries and to convert potential resources to reserves at a rate adequate to support projected nuclear power expansion," said a 1976 report put out by DOE as part of the National Uranium Resource Evaluation (NURE) project it launched in 1974.

Under the NURE program, airplanes are flying grid paths five miles apart over every state except Hawaii seeking uranium; geologists are examining rock formations; hydrogeologists are sampling surface waters, groundwaters, and stream sediments; technologists are trying to develop ever more sensitive instruments. Even data from satellites is being analyzed.

The search so far has been fruitful. Since 1974, when the program began, almost 100,000 tons of \$30 per pound uranium has been found. More than three-quarters of

the country's uranium is in New Mexico and Wyoming. The rest is divided among Arizona, California, Colorado, Idaho, Oregon, Texas, Utah, and Washington.

Many geologists believe that little uranium remains to be found in the U.S. although scientists can't be sure. The NURE program uncovers only the approximate locations of uranium beds. Uranium is moody, erratic. For the most part, it prefers to fraternize with sandstone. But it can be found loitering around granite, quartz, limestone, shale. It likes to hide along fault lines and roll fronts. It hides well.

In an oil field, a new well sunk next to a producing well stands an excellent chance of success. In a uranium deposit, a driller may find rich ore in one spot but end up with little more than a hole in the earth 10 yards away.

To find exactly where — and how rich — the uranium is, the industry drilled 90,000 holes last year. The holes added up to 49 million feet in depth. Laid end to end, they would stretch from Florida to Hawaii, and come most of the way back. The search for uranium cost the companies \$236 million last year, and will cost more this year.

Uranium companies own, or hold the rights to work and explore, 25 million acres — more land than is in the entire state of Indiana. A Congressional investigation last year revealed evidence that much of this land was acquired from the public illegally and is being held for speculative purposes, pushing the price of uranium up. Eighteen of the nation's major oil producers hold extensive interests in the uranium industry.

DEEPER, POORER, MORE COSTLY

As the search widens, the holes get deeper, the mines go farther, the ore gets poorer. Uranium prices rise.

Five years ago, uranium oxide, under contract, cost \$7.10 per pound. Today, it costs twice as much. But that reflects only contracted prices. On the open market, it was being quoted at \$44 per pound last December. Most analysts expect uranium oxide to be selling at around \$75 per pound in the early 1980s.

Inflation, increased production costs, the Arab oil embargo of the 1970s, higher wages, lower grade ore — all those accounted only for part of the increase. An international cartel made up of the world's largest uranium producers pushed prices into orbit, Westinghouse Electric Corp. has charged.

Westinghouse in 1972 signed contracts to provide uranium fuel to 10 electric utilities for \$7 per pound. Four years later, after the price of uranium had shot up, Westinghouse said delivering uranium at the agreed-on price would bankrupt it. The utilities demanded that Westinghouse fulfill the terms of its contracts and sued.

Westinghouse filed its own suit in October of 1976 saying that 17 American uranium producers formed a cartel with 12 foreign producers to drive up the price of uranium five-fold. Gulf Oil Corp., Anaconda Co., Kerr-McGee Corp., Getty Oil Co., and Homestake Mining Co., among others, formed "illegal combinations and conspiracies" to increase the price of uranium, and "went to great lengths to conceal and disguise" the cartel, Westinghouse said.

Because of the alleged cartel, Leonard Ross, a member of the California Public Utilities Commission, told a House subcommittee that the residents of his state alone would have to pay \$1 billion extra for electricity during the next 15 years.

The Westinghouse dispute has not yet been settled, though Westinghouse has reached an out-of-court settlement with one of the utilities.

Whatever the court's decision, it seems highly unlikely that the price of uranium will drop in the near future. DOE already is estimating uranium oxide resources in the \$50 per pound category — a strong indication that it soon may cost that much to produce at least part of the uranium.

As a result, more and more attention is being paid to alternative methods of procuring the oxide, and to bodies of land and water that contain relatively minute quantities of it.

Last year 500 tons of the nation's uranium oxide were produced as by-products of copper and phosphate mining, from the reprocessing of old uranium tailings piles, or from in situ mining. By the year 2000, DOE estimates that these unconventional methods, particularly by-product and in situ mining, could account for one-fifth of the nation's uranium production.

Some reactors could use thorium instead of, or in addition to, uranium. The world's richest body of thorium is on Lemhi Pass in Idaho, not far from Yellowstone National Park.

Then there are Chattanooga shale and seawater. It hasn't been economically feasible to extract uranium from shale because of its low concentrations (.004% as compared with .15% for ore). However, last September, DOE signed a contract with a consulting firm to take another look at the feasibility. If the choice eventually comes down to dropping the nuclear power program or going into the Chattanooga shale, Facer of DOE says, "I think the nuclear program would continue."

Seawater contains uranium in even more minute concentrations than the shale. Oak Ridge National Laboratory says that under the most favorable conditions, it may be possible to bribe seawater into giving up its uranium for \$200 to \$300 per pound.

"I don't expect to see any significant production from seawater — barring a major technological breakthrough — for the next 25 years," he said. "But development work certainly will continue."

In the meantime, plans are going full steam ahead to expand the conventional methods of uranium production. In 1976, 281 uranium mines were operating in the U.S., all but a few in the Rocky Mountains. Sixteen mills processed the ore. Although only 44 of the mines were open pit, they accounted for more than half the total production. ♦



Western Roundup



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FWS wants nominations of threatened wildlife areas

Conservationists, state game and fish agencies, and others throughout the West are being asked to help identify key wildlife habitat areas that need protection. The U.S. Fish and Wildlife Service (FWS) is now contacting people to ask for nominations of areas that, if chosen, would be purchased or protected by easements using money from the Land and Water Conservation Fund.

Mark Strong, head of the study for the Billings office of the FWS, says the agency will be looking primarily at private land that is facing immediate threats. Some of the criteria that will be considered will be: potential for environmental education at the site, whether or not the site represents a unique or nationally significant ecosystem, and the diversity of species at the site.

Presently, state game and fish agencies have the funds to manage game species from hunting license fees, but many have little or no budget for protecting non-game species. The FWS previously has set aside wildlife refuges under specific congressional authorization and waterfowl refuges using Migratory Bird Hunting Stamp funds. Congress has now increased funding to make it possible for the agency to do a much more encompassing job.

FWS is now distributing project description forms for people to fill out for their nominations, including information on the

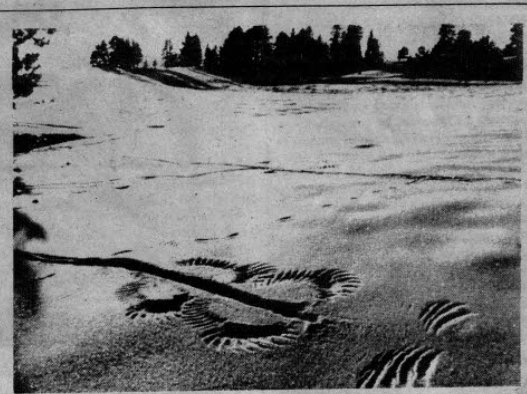
exact site, present land use, acquisition costs, present ownership, history, general description, wildlife species, threat of destruction, and past protection efforts.

The next stage will be to hold workshops where conservationists and others who made the nominations will set priorities. By November 1978 a concept plan will be prepared by each region. Money will be available by the fall of 1979. Although that deadline is a long way off, Strong says he is hoping to get many of the nominations by mid-April of this year. Some areas that face more immediate threats may still be able to be protected through cooperation with such organizations as the Nature Conservancy until FWS funds are available.

The areas that are ultimately chosen will be preserved primarily in their natural state.

To get nomination forms, write to the Land and Water Conservation Fund Project Director for your regional FWS office.

For Idaho, write Pacific Region, 1500 Plaza Bldg., 1500 NE Irving St., Portland, Ore. 97208. For Arizona and New Mexico, write Southwest Region, Dennis Chavez Bldg., 500 Gold Ave., SW, Albuquerque, N.M. 87103. For Colorado, Wyoming, Montana, North Dakota, South Dakota, and Utah, write Denver Region (Jerry Nugent), Box 25486, Denver Federal Center, Denver, Colo. 80225.



SARPY CREEK NOMINATION. One of the areas nominated for wildlife habitat protection is near Sarpy Creek, an area that is now threatened by coal development. Ed Dobson of Friends of the Earth, who has been fighting to protect the area since 1972, nominated it, saying it was habitat for raptors, prairie dogs, deer, pronghorn and turkey.

Westmoreland Resources now holds a lease to mine coal owned by the Crow Tribe there, but Dobson proposes the federal government exchange other coal for it.

Dobson took the picture above, which he thinks records a dramatic confrontation between a young coyote and an eagle.

Narrows Dam gets 'clean bill of health'

The U.S. Bureau of Reclamation has given the proposed Narrows Dam in Colorado a "clean bill of health," according to Sen. Floyd Haskell (D-Colo.). The dam was on the original Carter Administration "hit list" of water projects, but Haskell now says that there are indications that the Administration will now approve the \$145 million irrigation, flood-control, and recreation project.

The BuRec report says that a safe dam can be constructed on the site; the water quality of the Narrows reservoir "would not preclude" recreational use; the dam construction "would have no adverse impact on sandhill cranes" in a migratory pattern downstream; and that groundwater recharge alternatives to the dam are not feasible.

The National Wildlife Federation has urged that no more dams be built on the tributaries of the Platte River for fear of disrupting wetlands, which are essential habitat for sandhill and whooping cranes that migrate through Nebraska.

The Denver Post reports that the BuRec report didn't touch on the several complaints raised by environmentalists,

including: the dislocation of 642 residents; destruction of 40 historical and archeological sites; inundation of 15,000 acres of agricultural and wildlife lands; and the loss of 15 miles of free-flowing river.

Haskell says that the dam must still be finally approved by Carter, but "there is no earthly reason why the project should not go right ahead as planned."



Photo by Robert Hilgenfeld

PRESERVATION OF ANTELOPE and effective fencing of sheep herds are the subjects of a New Mexico modified fencing study.

Kootenai River dam stirs controversy

Controversy is beginning to develop over a proposed hydroelectric dam at Kootenai Falls in Montana. The dam, proposed by seven Montana utilities and Idaho-based Northern Lights, Inc., would be underwater and would generate 140 megawatts at the falls. Opponents of the project contend that the 90-foot-high series of cataracts is

one of the finest scenic attractions on the river and that the Kootenai is the "best free-flowing trout fishery in Montana."

Mike Comola, coordinator for Northwest Citizens for Wilderness, told the Associated Press, "Most people oppose the idea. They don't care if the dam is under water or what the environmental effects are. Most people in the area are simply opposed to any kind of dam at Kootenai Falls."

A second dam is also being proposed on the Kootenai in Idaho. This dam, the Katka Face Dam, would flood into Montana. Local activists are trying to get the Kootenai above this proposed dam included in the Wild and Scenic River System.

New Mexico fence study approved

After a year of haggling, the Bureau of Land Management (BLM), the New Mexico Department of Game and Fish, and a group of Roswell, N.M., ranchers have agreed to a cooperative study of modified fences to determine which modifications are beneficial to both wildlife and livestock.

The fence study will be used to determine what is the most beneficial method of maintaining antelope herds in New Mexico. Antelope do not jump over fences, but rather crawl under them. Consequently, wire mesh "sheep-tight" fence presents an almost insurmountable barrier to antelope.

Ranchers in the Roswell area had objected to the modifications because they claim that sheep will be able to get through the fences and that predator problems would increase.

Indian water recommendations

Assistant Interior Secretary for Indian Affairs Forrest Gerard has sent seven recommendations for an Indian water policy to be included in President Jimmy Carter's water policy.

The recommendations included: a government commitment to develop Indian water; exclusive federal court jurisdiction over Indian water rights adjudication; tribal participation in water planning; and the possibility of regional or basin-wide legislative solutions to Indian water rights controversies.

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MAN VERSUS NATURE

by Myra Connell

Continuing the discussion of the last two issues on weather modification:

Secretary of Interior Cecil Andrus is opposed to cloud seeding. He has pointed out that lawsuits might result from taking water from clouds in one part of the country and transferring it to another part. He believes that massive seeding for drought relief should be preceded by research, since full knowledge of environmental impacts is lacking at present.

Many others express similar concerns. Norton Strommen, director of the Center for Climatic and Governmental Assessment in Columbia, Mo., has stated "There's only so much moisture in the atmosphere, and if you take it out in one place, it's gone."

Carl Bledsoe, a member of the Colorado Legislature, is opposed to seeding because cloud seeders can't show proof that their actions don't affect weather downwind.

The Ouray County Plaindealer in southwestern Colorado has opposed a five-year project in the San Juan Mountains aimed at keeping the snowpacks at average amounts. Results could be detrimental to wildlife and plants that are acclimated to alternating winters of heavy and light snow. Other impacts that might



occur, according to the Ouray County Plaindealer and Herald: (1) maladjustment of humans to consistently severe winters; (2) fewer tourist dollars because of shorter summers; (3) muddy beet fields; (4) increased costs of snow removal; (5) flood problems; (6) increased danger of avalanches.

The Ouray newspaper calls cloud seeding a short-sighted political band-aid that might complicate drought in the future.

Robert T. Brown, chief hydrographer for Southern California Edison said in a Los Angeles Times article that people looking for drought relief (in cloud seeding) are

going to be disappointed.

Cloud seeding is not fully understood, nor is weather itself, since it is a complex interaction of sunlight, the tilt of the earth, its distance from the sun, sunspots, volcanic dust, and more.

Human meddling has already had effects on the weather. Overgrazing, irrigation, concrete highways, parking lots, streets, and plazas cause increased runoff and destroy moisture-retaining plants. Carbon dioxide increases with burning of fossil fuels and wood, which slowly increases the earth's temperature. It should be plain that further intentional interference will only magnify our problems.

An English author writing of the drought in England in Audubon magazine stated "the crisis is largely man-made and water supplies would be adequate were it not for man's folly. . . ."

The National Weather Modification Act of 1976 provides for a program of research and development to determine how technology might be used to "manipulate" nature to the public welfare. But as the facts come out, there may be a tendency toward placing limitations on playing God with our weather.

As everyone knows, Ohio was declared a disaster area in January following the worst storm in history. Three thousand National Guardsmen were called out to assist the unprepared populace. Is it not possible that human disturbance of the weather patterns could have been a factor in the extreme weather?



HCN Bulletin Board



ADOPT A WILDERNESS

"Adopt a wilderness training workshops," to prepare conservationists for the next phase of the U.S. Forest Service's Roadless Area Review and Evaluation (RARE II) will be held in Colorado on the following dates: Colorado Springs, March 19; Dillon, March 20; Crested Butte, April 1; Denver, April 8; and Grand Junction, April 29. More information can be obtained from the workshops' sponsor, the Colorado Open Space Council Wilderness Workshop, 1325 Delaware St., Denver, Colo. 80204.

WYOMING HOT LINE

Wyoming residents have free access to accurate, up-to-date information on energy conservation through the Wyoming Energy Extension Service. The hot line operates five days a week from 10 a.m. until 4 p.m. at 1-800-442-6783. The office is linked by computer to the national energy bank in Oak Ridge, Tenn., which will be used for some questions. Others will be answered at the time of the call. The service is offered as part of a pilot project funded through the U.S. Department of Energy.

NORTHERN TIER PIPELINE

The Bureau of Land Management is holding a series of informal public meetings along the route of the proposed Northern Tier Pipeline System. The system would deliver crude oil from Port Angeles, Wash., to Clearbrook, Minn. Meetings in the Rocky Mountain-Great Plains region are scheduled for March 14 in Missoula, Mont.; March 15 in Coeur d'Alene, Idaho; March 21 in Billings, Mont.; and March 22 in Bismarck, N.D. For more information contact the Project Manager, Northern Tier Environmental Team, P.O. Box 2985, Portland, Ore. 97208 or call (800) 547-5532.

DUNOIR WILDERNESS

The U.S. Forest Service has published a draft environmental statement for the management of the DuNoir Special Management Unit in Wyoming. Conservationists have criticized as too small the proposed additions to the Washakie Wilderness included in the plan. Much of the roadless land in the unit is covered by forests that are attractive to the local timber industry as well as to recreationists and preservationists. The plan can be obtained from USDA, The Forest Service, Shoshone National Forest, Cody, Wyo. 82414. A public hearing will be held in Dubois, Wyo., on Apr. 1. Written comments on the statement are due June 2.

CACTUS ALLIANCE ACTION

The Cactus Alliance, a group from New Mexico, Nevada, Colorado, and Arizona that opposes nuclear power development, is reminding its membership to attend the Environmental Protection Agency's conference on "Environmental Protection Criteria for Radioactive Wastes." The conference will be in Denver March 30 to April 1. "Sounds dull, but with lively input from nuclear activists streaming in from other parts of the country, it promises to be exciting, with sharp focus on public acceptance of the waste criteria," says an article in the group's newsletter, the Cactus Alliance News. For more information contact one of the group's Colorado coordinators, Judy Danielson, AFSC, 1428 Lafayette, Denver, Colo. 80218.

SOLAR GREENHOUSES

A list of addresses for 11 solar greenhouse plans is available free from the National Solar Information Center, Box 1607, Rockville, Md. 20850 or call toll free (800) 523-2929. Ask for Solar Greenhouse Annotated Bibliography and Plans List.

HAZARDOUS WASTES

The Colorado Department of Health will hold five public hearings in March to allow the public to comment on the development of a state plan for handling solid and hazardous wastes under the federal Resource Conservation and Recovery Act. The meetings will be in Craig on March 22, in Montrose on March 23, in Pueblo on March 27, in Denver on March 29, and in Fort Morgan on March 30. For more information contact the department at 4210 E. 11th Ave., Denver, Colo. 80220.

WATER LAW COURSE

Legal experts from several Rocky Mountain States will teach a "water law short course" in Albuquerque, N.M., March 28-30. The course is jointly sponsored by the University of New Mexico and the U.S. Fish and Wildlife Service. The course will cover regulation and management of surface waters, with special emphasis on protection of instream uses of water. For more information, contact Dave Flaherty in Fort Collins at (303) 493-4275.

ELK RIVER, COLO.

Public meetings on the Elk Wild and Scenic River study will be held in Denver and Steamboat Springs, Colo., in April. A study team has found that the river is eligible for inclusion in the National Wild and Scenic River System. At the meetings the study team and the public will discuss what recommendations should be made to Congress. The Denver meeting will be April 3 at 7:30 p.m. in the State Centennial Building. The Steamboat meeting will be April 6 at 7:30 p.m. at the Yampa Valley Electric Association. A public information packet is available from Tom Lonberger, Routt National Forest, P.O. Box 1198, Steamboat Springs, Colo. 80477.

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BY LANA SELDEN

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FAMILY PLANNING CENTER. Providing responsible counseling, thorough educational classes, clinics. Costs no more than you can afford. Anyone is eligible. Serving eight Wyoming counties with outreach RNs. NOWCAP, 268 Main Street, Lander, Wyo. 82520. (332-9315).

WANTED. HCN office manager. Duties include typesetting, bookkeeping, handling subscriptions, answering telephone. Bookkeeping and good typing skills necessary. Must be willing to accept responsibility. Salary \$375 per month for full-time work. Contact Joan Nice at High Country News, Box K, Lander, Wyo. 82520. Job starts May 1.

OPPORTUNITY. A truly unique opportunity exists for a talented, dynamic fundraiser, with a conservation ethic. The Colorado Conservation Fund is looking for a self-starter, anxious to accept this challenge in Denver, Colorado. Two well-established citizen environmental groups have formed a non-profit corporation to help meet the rising costs of environmental activism. If you are interested in this opportunity to develop a rewarding career send a letter, resume, references, etc. to: Colorado Conservation Fund, 2239 E. Colfax Avenue, Denver, Colorado 80206.

Eavesdropper

environmental news from around the world

LOONEY LIMERICKS
by Zane E. Cology

"The state must have holes in its cranium!"
Said the company mining uranium.
"In order to pass
They make us plant grass—
Even though we had planned a geranium!"

EAGLE KILLERS FINED. Three Texas men were fined a total of \$6,000 for killing at least 70 eagles from a helicopter. The judge in the case warned area ranchers against violating the law protecting the eagles, urging them instead to have it changed if they disagree with it. The case touched off a controversy in Texas between

sheep ranchers and environmentalists. The judge told the convicted trio's supporters after the trial that the jury might have cleared the men if they had based their defense on the doctrine of self-preservation, according to United Press International.

POLLUTION CONTROL SAVES MONEY. The cost of pollution control are more than repaid by the savings resulting from decreases in pollution-related illnesses and deaths, according to a recent study. The book, *Air Pollution and Human Health* indicates that a 50% reduction in the levels of sulfates and particulates in the atmosphere lowers pollution-related deaths by seven per cent and saves an estimated \$16.1 billion in medical care and lost wages, the *Los Angeles Times* reports.

BOUNTY HUNTING. Two Pennsylvania State University professors and a chemist have collected a total of \$10,000 for reporting four Pittsburgh companies that were polluting the rivers around the city, according to *Conservation News*. The two professors took samples of the water and had them analyzed. The findings resulted in a fine of \$20,000 to the companies involved. Under the 1899 Rivers and Harbors

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Act, the "bounty hunters" are eligible for half of the fines levied.

HOUSE VOTES GRAZING FEE MORATORIUM. The U.S. House of Representatives has approved a bill, sponsored by Rep. Teno Roncalio (D-Wyo.), that would halt for one year the increase in grazing fees during fiscal year 1978. The delay is designed to give the Congress time to study the increase and take appropriate action next year. The bill now goes to the Senate, which is expected to approve the moratorium also.

WANTED: TULE ELK HABITAT. The California Fish and Game Department has abandoned its plans to shoot 92 tule elk instead of finding new homes for them. According to *Conservation News*, the state decided not to "cull" the animals, which, they said, exceeded the carrying capacity of 490 in the Owens Valley of central California. Instead, 62 of the elk were tranquilized and relocated to the Concord Naval Weapons Station and Grizzly Island. The state is trying to establish a free-roaming herd in their native range but is having difficulty keeping the elk out of cultivated row crops.

HUD THINKS SMALL. The U.S. Department of Housing and Urban Development (HUD) is creating a task force to study the development problems of rural areas and small towns. The task force is being set up in response to criticism that HUD has placed too much emphasis on distressed large cities. A National League of Cities survey of small town officials found that their most frequently mentioned problem was meeting the requirements for federal programs, according to the Associated Press.

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PUBLIC NOTICE WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY WATER QUALITY DIVISION

On March 30, 1978, at 9:00 AM, at Durham Hall, Aley Fine Arts Building, Casper College, Casper, Wyoming, the Wyoming Department of Environmental Quality, Water Quality Division, will present to the public and the Wyoming Environmental Quality Council, proposals for modifications of the following Water Quality Division Rules and Regulations:

Chapter V — Regulations Governing the Certification of Water and Wastewater Systems Operators and Classification of Water and Wastewater Systems for Wyoming

Chapter VII — Regulations Governing the Surface Discharge of Water Associated with the Production of Oil and Gas

Copies of any or all of the proposed modifications may be obtained from: Water Quality Division, Department of Environmental Quality, Hathaway Building - Cheyenne, Wyoming 82001. Oral statements from the public and interested local, state, and federal agencies will be received in the following order: Chapter VII — 9:00 AM; Chapter V — Upon completion of comments on Chapter VII. Written copies of oral statements should be presented to the Hearing Officer at the hearing. Written statements need not be presented orally, but may be presented to the Hearing Officer at the time of the hearing, or may be submitted by mail prior to March 30, 1978, to: Mr. Robert E. Sundin, Director, Department of Environmental Quality, Water Quality Division, Cheyenne, Wyoming 82002.

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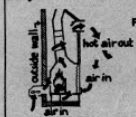
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16-High Country News — Mar. 10, 1978

House votes on Absaroka-Beartooth

by Dale Burk

The U.S. House of Representatives is expected to vote next week on the 904,500-acre Absaroka-Beartooth Wilderness bill. According to sources in Washington, the vote has tentatively been set for March 14 under House suspension rules. This would require a two-thirds vote for passage.

Little opposition is expected. The bill, S. 1671, was unanimously passed by the Senate Feb. 10 and has been approved by the House Interior Committee.

A potentially crippling amendment proposed by Rep. Ron Marlenee, (R-Mont.) that would separate the Absaroka (on the west) and Beartooth areas with a road corridor at Slough Creek was beaten on two occasions in committee action. Despite the committee defeats, Marlenee is not expected to oppose the bill vigorously on the House floor.

The corridor is located north of the Montana-Wyoming line on the Custer and Gallatin National Forests. The southwestern portion of the proposed wilderness joins the northern boundary of Yellowstone National Park.

Clifton R. Merritt of The Wilderness Society's regional office in Denver said the

area involved is high, fragile, and critical watershed country. "It represents some of the most spectacular mountain wilderness left on the continent," Merritt says. "It is the home of endangered species and other wildlife that require wilderness to prosper — grizzly bear, wolf, bighorn sheep, mountain goat, moose, elk, cougar and cutthroat trout."

The society's Montana representative, Bill Cunningham, says passage of the Absaroka-Beartooth Wilderness bill would provide the largest single-area addition to the wilderness system since passage of the Wilderness Act in 1964.

S. 1671 does not include, however, a contiguous 46,000-acre unit in Wyoming called the High Lakes Plateau. It was omitted from the bill because of the objection of Sen. Clifford Hansen (R-Wyo.).

Separate legislation sponsored by Rep. Teno Roncalio (D-Wyo.) to establish a High Lakes Plateau Wilderness will be the subject of a hearing March 31 in Powell, Wyo. (see editorial).

The Absaroka-Beartooth Wilderness bill was sponsored by the late Sen. Lee Metcalf, D-Mont., who died Jan. 12, two weeks before committee mark-up was to begin on the bill.

Subsequently, the committee approved

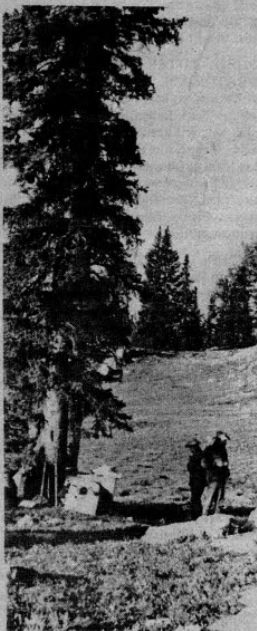
S. 1671 as Metcalf had outlined in work with his staff before his death. This called for several changes from the original 913,500-acre proposal.

Included were the addition of 600 acres at Woodbine Falls, the longest free-flow waterfall in Montana, and the deletion of approximately 6,900 acres.

The deletions included 4,500 acres on the Timberline-Basin Creek Plateau which has heavy recreational use, 1,400 acres at Kersey Lake for off-road vehicles and a subdivision on a patented mining claim, 150 acres on the North Fork of Deep Creek to provide for a possible trailhead facility, and 800 acres in the Independence Peak area.

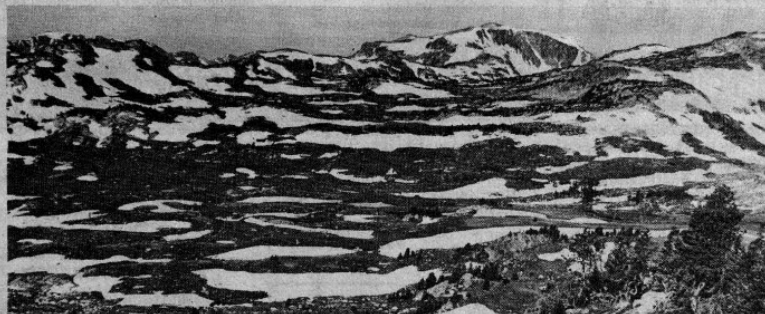
The Goose Lake jeep road also was taken out, but the compromise on this point kept Goose Lake itself in the wilderness.

A subsequent change engineered in the Senate by Sen. John Melcher (D-Mont.) excluded another 1,500 acres in the Stillwater drainage. The land involves a request by The Anaconda Company for a 2,000-acre exclusion, but both the House and Senate agreed that the entire west fork of the Stillwater River would be left in the wilderness, so 500 acres of the area will remain wilderness.



THE ABSAROKA-BEARTOOTH WILDERNESS bill would provide the largest single-area addition to the wilderness system since passage of the Wilderness Act in 1964.

Photos by Dale Burk



Dear Friends

We made room for a thorough examination of the uranium mining milling industry in this issue. As you will see, it's a complex issue laced with the human emotions of love and fear. It's a lively tale, with its own vocabulary of rems, rads, and gigawatts — with enormous implications for the Western way of life and for our national energy outlook.

The work was exciting for us and a major undertaking for writer Justus Bavarskis. Now a freelancer in Hudson, Wyo., he has worked as a reporter and an editor for United Press International news service in New York City and Detroit. He put more than two full months of research into the uranium project. That included Wyoming trips to Cheyenne, to tour a Western Nuclear mine and mill at Jeffrey City, and to look at surface mining and exploration on Green Mountain. It also meant hundreds of phone calls to government agencies, private firms, uranium experts, and ordinary people whose lives have been changed by uranium.

The work was slowed by some of his sources' reluctance to give him information. A Western Nuclear official told him the company hesitated to allow him to tour their facilities because the

mining industry had been badly treated by the press in general and feared *High Country News* in particular.

Nevertheless, three Western Nuclear executives spent a good part of their day with Bavarskis. We are thankful that they did, because that tour gave him a feel for the operation and the tools to describe it vividly. It gave the company a chance to respond to accusations made in other camps. It also convinced Bavarskis of the executives' sincerity. The fact that they, and in at least one case their children, are working in the mines is proof that they believe what they say about safety.

Exxon, which runs the Highland

uranium mine near Douglas, Wyo., did not make the same kind of impression on our reporter. The company refused when he requested a tour of its facilities. After several phone calls, it was agreed that our reporter should put his questions in writing and send them to the company's public relations man in Houston, Tex., J. W. Bragg.

Bragg opened his letter to Bavarskis by stating, "responsible people will tell you their perception of the situation even if it is unpleasant to do so." In succeeding paragraphs he declined to tell Bavarskis his perception of the situation.

Officials of the U.S. government were sometimes not much more cooperative. The Nuclear Regulatory Commission has yet to answer questions that Bavarskis sent off weeks ago. On the other hand, most state agencies and the U.S. Environmental Protection Agency were very helpful, he said.

The result of these and many other struggles is an article that makes us proud. Our thanks to Arvydas Paulikas for his technical review and to Bavarskis for a herculean effort. We hope you find the article interesting and useful.

—the editors



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