



REGULATIONS

New Mining Regs, New Discontent

Of the 262 million surface acres of land under the care of the Bureau of Land Management (BLM), about 85% is potentially available for mining. According to the 1999 National Academy of Sciences report *Hardrock Mining on Federal Lands*, more than 157,000 acres are already being mined or are affected by active mining exploration. With the new year 2002 came new rules for mines that operate on public land overseen by the BLM.

These “3809 regulations”—which took effect on 31 December 2001 against vehement protests from environmental organizations such as the Mineral Policy Center and Great Basin Mine Watch—are a scaled-back version of rules signed in the last days of the Clinton administration. The new rules remove provisions that environmentalists say are vital for protecting air, water, wildlife, and such cultural resources as Native American sacred sites, but that industry groups say would cripple their ability to function.

The final Bush rules retain many aspects of the Clinton version. They regulate small exploratory operations of five acres or less that had been exempt under earlier rules. They require mines to control the discharge of cyanide, which is used to strip minute particles of metal from ore. They require mines to control acid mine drainage, a process in which the combination of water, air, specialized bacteria, and the sulfides found in some types of ore produce environmentally damaging acidic water. And they require mines—new or existing—to provide financial guarantees, or bonds, that cover the cost of reclamation (as estimated by BLM staff) after a mine closes.

But the Bush administration also removed several rules that were vital to protecting the

environment, says Great Basin Mine Watch director Tom Myers. Missing, he says, are rules that addressed chronic mining problems: pollution such as increases in arsenic and mercury in surface and groundwater, and dewatering, the process in which groundwater levels are lowered to make mining possible. The new regulations do require that mining companies line their waste facilities, but, Myers says, “if there is a leak, the BLM can’t go beyond requiring a liner to actually [requiring that mining companies] clean up the groundwater”—that’s where other laws such as the Clean Water Act would presumably step in. Thus, says Jack Gerard, president and CEO of the National Mining Association, most of the provisions that were eliminated were unnecessary because they duplicated existing federal and state laws covered in the hundreds of permits a company must acquire before mining starts.

Although the bonding requirement was retained, it was significantly weakened, critics say, because the new rules lack the reclamation standards featured in the Clinton version. “What the provision [still] says is the bond would have to pay for one hundred percent of cleanup, but now it’s very unclear what one hundred percent of cleanup would mean,” says Lexi Shultz, director of regulatory and legislative affairs for the Mineral Policy Center. “Now the cleanup standards in the regulations are gone. So in addition to no longer assuring that there is going to be full environmental cleanup, what it also could mean is that the mining companies will have to post much lower bonds because what they have to pay for is not spelled out.”

Especially disappointing to environmental organizations was the elimination of a provision that required mining companies to show that proposed new operations would result in no “substantial irreparable harm” to environmental, cultural, or scientific resources before they could be issued a permit. Gerard claims this so-called veto provision, which was inserted into the Clinton rules after the public comment period, was unfair, and that the grounds for which the BLM could have refused a permit, and the point in the process at which a refusal could have been issued, were unpredictable and arbitrary. “What it says is that, after meeting all of the criteria that the government sets out before you, [the BLM] can still say no. We think it is unconscionable to have such an open-ended provision,” Gerard says. “There is no criteria to determine when you’ve met the task.”

Although this provision covers much of the same legal ground as other environmental laws, Shultz says, it’s necessary because it’s the only way to prevent a potentially destructive mine before the damage begins. “In theory [the BLM has] the right to stop a mine if the permit would violate the Clean Water Act or the Endangered Species Act,” she says, “but you’re never going to know that until the mine’s in place.” —**Scott Fields**



Churning up controversy. New mining regulations have industry and environmentalists at odds.

PhotoDisc

AGRICULTURE

Spare the Plow, Save the Soil

After 8,000 years of use, the plow is getting the shaft as farmers around the world demonstrate that less can be more. By plowing less using no-till farming methods, farmers are getting higher crop yields and using fewer inputs such as water, pesticides, and tractor fuel. In addition, soil erosion and equipment and labor costs are reduced. "For decades, agronomists have known that conventional plowing isn't entirely beneficial," says Dan Towery, a natural resources specialist with the Conservation Technology Information Center in West Lafayette, Indiana, "but farmers were reluctant to change [for fear] of reduced yields."

In no-till farming, soil is not disturbed between harvesting one crop and planting the next; seeds are planted in stubble or sod instead of plowed soil. The goal of no-till is to leave as much of the soil surface and ground cover undisturbed as possible to provide protection against erosion, reduce soil crusting, and increase the soil's organic content. "The number one way to keep soil from eroding," says Towery, "is to keep it covered, and no-till leaves the most residue."

In a presentation at the First International World Congress on Conservation Agriculture, held in October 2001, agronomist Rolf Derpsch said the United States has the largest area of no-till in one country, with 21.1 million hectares (18% of total cropland). The Brazil–Argentina–Paraguay region comes in second with 27 million hectares (as many as 90% of Paraguay's mechanized farms use no-till methods). Asia recently moved into third place: since 1998 the adoption of no-till more than tripled to over 100,000 hectares in 2001. Scientists at the International Maize and Wheat Improvement Center speculate that no-till in Asia may exceed 300,000 hectares within the next year. The absolute numbers of acres involved may not be high, but the rate of adoption is remarkable, says Wayne Reeves, a lead scientist and research agronomist at the U.S. Department of Agriculture–Agricultural Research Service National Soil Dynamics Laboratory in Auburn, Alabama.

Reeves is especially concerned with the effects of plowing on releasing carbon dioxide. "Each [plow pass] oxidizes organic matter and results in the release of carbon

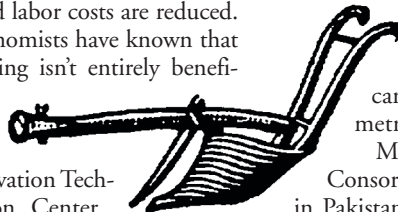
dioxide, which contributes to global warming," says Reeves. "By not tilling, the carbon is instead used to increase organic matter levels [in the soil]." He cites research by soil scientists at the U.S. Environmental Protection Agency Environmental Research Laboratory in Corvallis, Oregon, first published in 1993 in the *Soil Science Society of America Journal*, which estimated that if 76% of U.S. cropland were converted to no-till by 2020, it would change U.S. agriculture from being a net emitter of carbon into the atmosphere (with 188–209 million metric tons of carbon lost to the atmosphere) to being a net sink for carbon (storing 131–306 million metric tons of carbon).

Members of the Rice–Wheat Consortium for Indo-Gangetic Plains in Pakistan, Nepal, and India have found that no-till shortens the turnaround time between rice and wheat planting, allowing farmers to plant wheat on time and obtain better yields. Farmers using no-till sow wheat in a single operation immediately after the rice harvest, planting the seed directly into rice stubble.

Farmers in these same countries are using as much as 30–50% less water for irrigation since 1998, according to the consortium and the International Maize and Wheat Improvement Center. These groups also indicate that farmers use less herbicides—no-till results in two-thirds to one-half fewer weeds than conventional tillage, which brings weed seeds to the soil surface. Farmers can also get seed in earlier, before the soil dries up and in time for crops to mature fully before harvesting begins.

Although the first no-till planting occurred in the United States in the mid-1970s, Peter Hobbs, the International Maize and Wheat Improvement Center representative for South Asia, says there wasn't much interest until the past decade, when farmers in many regions began witnessing dramatic declines in profitability. These were partly related to ecologic degradation associated with conventional technologies such as unbalanced use of fertilizers, delayed planting, and the overuse of plowing, but also due to increased input costs including fuel and low output prices.

"We have lots of cases where an innovative farmer who agreed to try no-till was ridiculed by his fellow farmers," says Hobbs. "In some cases a farmer would plow up his field rather than be embarrassed. However, most [farmers who use no-till] get excellent results, and then it is hard to stop the other farmers from trying." —**Corliss Karasov**



Fake Cows Kill Flies

The number of cases of African trypanosomiasis, or sleeping sickness, which threatens over 60 million people in 36 countries, has dropped from 10,000 to fewer than 100 in Zimbabwe through the use of artificial "cows." The fake cows use chemicals derived from cow urine and breath to attract the blood-sucking tsetse flies that spread the disease. Formed of panels of blue and black cloth, the fake cows are soaked in insecticides that kill the flies when they land. Use of these devices has greatly reduced the amount of pesticides needed to control tsetse flies, amounts that reached 200 tons per year in the mid-1980s.



Taking the LEED

The U.S. Green Building Council, under a contract with the U.S. Department of Energy, has developed a national standard for rating environmental sustainability in existing or proposed commercial and institutional buildings. The Leadership in Energy & Environmental Design (LEED) Green Building Rating System assigns ratings based on specific site characteristics, design strategies, and construction features. The cities of Seattle (Washington), Austin (Texas), and Portland (Oregon) have made the LEED system a part of their design review and building permit process. The National Park Service and the U.S. Navy and Air Force are also making use of the system. The council is developing systems for single-family and low-rise residential buildings, as well as for commercial interiors, and has established training and accreditation programs to certify green building specialists.

Feds Fund Waste Fight

Hazardous substance research got a boost in November 2001 when the U.S. EPA announced the formation of five university-based centers to conduct basic and applied research and provide technology transfer and community outreach. The centers will be funded with more than \$22 million in grants, with 33% of the money allocated for outreach projects to help low-income communities become more involved in the hazardous substance management decisions affecting them. The centers will also study brownfield remediation and redevelopment.

The new centers, which will be located at Johns Hopkins, Purdue, Oregon State, Louisiana State, and Colorado State, are part of the EPA's efforts to study and clean up the thousands of hazardous waste sites located throughout the United States.



FOOD SAFETY

The Price of Bottled Water

Over half of Americans drink bottled water, spending 240–10,000 times more per gallon for bottled water than they do for tap water, a trend largely fueled by the belief that bottled water is safer and healthier than tap water. Is the cost worth it? Controversial reports from the World Wide Fund for Nature (WWF) in Gland, Switzerland, and the Natural Resources Defense Council (NRDC) in Washington, DC, say no.

The 2001 WWF report *Bottled Water: Understanding a Social Phenomenon*, an overview of the bottled water market, targets the environmental effects of bottled water production. The report estimates that 1.5 million tons of plastic are used in bottling 89 billion liters of water worldwide each year. In addition, the energy used in manufacturing plastic bottles, recycling them, and transporting them to market all drain fossil fuels and contribute to greenhouse gases.

The report suggests lessening negative environmental health effects by simply washing and reusing plastic bottles rather than recycling them, and by international companies using local bottling facilities to reduce transportation needs. Indeed, says Stephen Kay, vice president of communications for the International Bottled Water Association (IBWA) of Alexandria, Virginia, water cooler bottles already enjoy a 99% reclamation rate, although they can only be reused so many times before they simply wear out.

The report, however, does not address health concerns raised by an earlier (1999) NRDC report. According to *Bottled Water: Pure Drink or Pure Hype?*, U.S. city tap water, monitored by the U.S. Environmental Protection Agency (EPA), must undergo more rigorous testing and in certain cases faces higher standards than bottled water, monitored by the Food and Drug Administration (FDA).

The IBWA flatly refutes this charge, saying that FDA regulation requires that bottled water standards be at least as protective of public health as EPA standards for tap water. Furthermore, unlike water utilities, bottlers are subject to penalties and recalls if their product is found to be falsely or misleadingly labeled or to contain what the Federal Food, Drug, and Cosmetic Act calls any “deleterious substance which may render it injurious to health.” The problem, according to

the NRDC, is the many gaps in the FDA’s coverage of bottled water, including exemption of water packaged and sold in the same state and lack of regulations for contaminants such as phthalates and *Cryptosporidium*.

The NRDC sent 103 brands of bottled water sold in the United States to be tested at independent, certified water-testing laboratories. A quarter of the samples contained chemical or microbiologic contaminants, including toluene, phthalates, and nitrates—though generally below levels deemed hazardous by law. Eight percent of the water purchased in California exceeded the 5 ppb warning level set for arsenic in that state, and samples from around the country contained coliform bacteria, although these results were not duplicated in later tests.

According to the NRDC report, bottled waters also may not be drawn from the pristine sources suggested by their labels. For instance, one brand advertised as “pure glacier water” came from a public water supply, and another touted as “spring water” was pumped from a parking lot next to a hazardous waste site. In addition, says Erik Olson, senior attorney at the NRDC and the report’s lead author, phthalates from plastic water bottles can leach into the water under certain storage conditions, especially when exposed to high temperatures and sunlight.

But the IBWA points to its Model Bottled Water Code as an internal mechanism that bolsters state and federal regulation of bottled water. The nonenforceable code sets forth strict guidelines for IBWA members, who comprise some 80% of the sales of bottled water in the United States. Under the code, bottlers are encouraged to use a multi-barrier approach employing several water purification techniques (such as distillation, micron filtration, and ozonation) to ensure safety and quality of all water sources, including municipal water, and to address the threat of nonregulated contaminants such as *Cryptosporidium*. The code has also adopted EPA standards for phthalate and coliform contamination.

Whether or not bottled water is as safe as tap water or safer appears to depend on whom you ask. But one thing the WWF, the NRDC, and the IBWA all claim to agree on is the global need for good water. Filters on home faucets offer a short-term solution for tap water known to be contaminated. Consumers should buy filters proven to specifically remove a contaminant of concern (such as arsenic) and should choose filters certified by an independent group such as NSF International. —Carol Potera



Murky waters. Reports say bottled waters aren't clearly healthier or safer than tap.

INNOVATIVE TECHNOLOGIES

A Better Way to Water

Two years ago, the death of trees at Florida's 2,500-acre Flatford Swamp sparked an investigation by the Southwest Florida Water Management District, which concluded that the trees were drowning. “From March to May, there should be very little water in the swamp,” says David Tomasko, a senior environmental scientist with the district, “but it has stayed wet for the entire dry season for ten to fifteen years now.”

Irrigation, while necessary, is the source of about 12–15 million gallons of

extra water that enters the swamp each day; the occasional rains that fall during the dry growing season can inundate fields, causing subsurface water to seep into nearby swamps. To restore the swamp, the district is sponsoring projects to reduce movement of irrigation water off-site. One project is paying half the cost to redirect swampbound water back to irrigation systems on about 1,600 acres of farmland. A second project is testing whether an innovative irrigation system known as fully enclosed seepage can reduce seepage in the first place.

Fully enclosed seepage is a relatively new irrigation method, says Ronald Cohen, project manager for the district. The system uses drip irrigation equipment pioneered in

Israel. Among its advantages are better control of how much water is applied, which seems to improve crop yields, says Cohen. “The closer you are to the roots and the more uniform the water supply, the better.”

In conventional irrigation, water flows down open ditches between crop rows, often saturating the entire upper layers of soil. The new technique, developed with the help of Craig Stanley, a researcher at the University of Florida's Gulf Coast Research and Education Center, uses buried drip irrigation pipes to inject water about 24 inches under the ground. The water drips to an impenetrable hardpan about three feet below ground, which holds the water for take-up by plant roots. By keeping the upper soil layers drier, more



United Nations Convention to Combat Desertification

Desertification is a global problem. As of 1998 it affected more than 900 million people in 100 countries, a number expected to double by 2025. Twenty-five percent of the earth's land area experiences desertification to some degree, with approximately 41.5 million hectares of agricultural land losing all or a portion of its productivity every year. Desertification is acute in areas such as Pakistan, China, and the Sahel region of Africa, where mushrooming populations create an intense need for food and fuel production, often at the expense of the environment.

In December 2000, the World Health Organization (WHO) issued a statement declaring that desertification represents "a serious threat to human health," with health consequences including malnutrition, respiratory diseases, burn injuries, and waterborne diseases such as cholera, typhoid, and hepatitis A. In addition, declared the WHO, desertification can endanger traditional medical practices when sources of herbs and other natural materials are lost. The United Nations Convention to Combat Desertification (UNCCD) came into force on 26 December 1996 with the goal of using innovative local programs and supportive international partnerships to prevent and resolve the conditions that lead to desertification. The secretariat of the UNCCD maintains a Web site at <http://www.unccd.int/main.php>.

The Web site's Information for Public and Media page provides links to information such as secretariat press releases, educational information kits for classroom use, books, posters, images, and the *Down to Earth* newsletter. Many of the materials are available in French, Spanish, Russian, Arabic, Chinese, and/or German. Multilingual fact sheets have been developed on topics including the causes and consequences of desertification, partnership agreements between aid donors and affected states, and how desertification is fought in certain regions.

The Regional Information page features a clickable map that directs visitors to areas providing information specific to each region, such as text summarizing the causes, effects, and extent of desertification for the region selected; action programs to combat and control the condition in the region; and reports submitted to the UNCCD Conference of the Parties. The Country Database offers a pull-down menu of the countries within each region that takes the visitor to information on when the country signed and ratified the treaty, national reports, action programs, experts within the country, and national Web sites devoted to desertification and related issues. —Erin E. Dooley



rain can be stored, Cohen says, which reduces runoff during heavy rains. He says the system is well suited to southwest Florida's unique farming situation, with its shallow water table.

Because wet fields foster fungus, the system also promises to reduce fungal disease, says Gary Bethune, director of engineering at Pacific Tomato Growers in Palmetto, Florida. In 2001 Pacific Tomato completed a three-year test of fully enclosed seepage irrigation on about 50 acres of tomato fields adjacent to Flatford Swamp. The technique used only two-thirds as much water as previous irrigation techniques, says Bethune. "It hit a home run in water conservation." Given Florida's falling water levels in aquifers and soaring state population

(16.8% growth in the 1990s versus 9.8% for the United States as a whole), he says, "that's a motive of tremendous importance."

At \$800 per acre, the subsurface system still costs more to install than conventional irrigation (\$500 per acre). "There are less expensive ways to irrigate crops, but they are not as water-conserving," Bethune says. He also fears that farmers may eventually be forced to compete with city residents for water: "The owners of Pacific Tomato . . . realize that the future is one of water conservation, that the company needs to be moving in that direction." He says the company plans to install fully enclosed seepage irrigation on 500 additional acres by fall 2002 at its own expense. —David J. Tenenbaum

One Way to Better Air

In 2000 Bangalore, India's fifth largest city, was estimated to be the third most polluted city in that country. But ambient air quality in parts of Bangalore has significantly improved since some of the city's streets changed to one-way-only driving. A study conducted by the Bangalore City Traffic Police shows that concentrations of carbon monoxide, nitrogen oxides, sulfur dioxide, and suspended particulate matter have been noticeably reduced since the changes were implemented in the spring of 2001. The improvements are attributed to better traffic flow at formerly congested intersections and a corresponding reduction in the amount of time vehicles spend idling while waiting to turn or proceed.



Learning from Minamata

Officials from China's first designated environmental model city, Zhangjiagang, have signed an agreement with the city of Minamata, Japan, to exchange environmental information. Officials in Minamata, the site of Japan's worst outbreak of mercury poisoning, hope to educate other cities about the problems it faced due to widespread mercury dumping in its coastal waters from the 1930s until 1966. During that time, hundreds of people died and thousands were disabled from mercury poisoning. Minamata officials are working to expand the program to other cities in China, where the occurrence of mercury poisoning is on the rise, in part due to industrial growth in the country.

Dropping Cigarettes in South Africa

Strict tobacco control measures in South Africa have resulted in eight consecutive years of declining cigarette consumption and a significant drop in the numbers of smokers in all age groups, most notably among 16- to 24-year-olds. Increased excise taxes led to the doubling of cigarette prices between 1993 and 2000. Other government control measures include the banning of tobacco advertising and sponsorships, banning of smoking in most public places, and restriction of sales of cigarettes to people under the age of 16.



Restaurants and bars can accommodate smokers only if they provide well-marked smoking sections that are separated from the rest of the seating area with a solid partition and equipped with air-extraction fans. Studies show that compliance with these regulations is quite high, and plans are under way to educate other countries about the success of this tobacco control program.