

resulted in both the government and the meat industry. The Attorney General advised that the departments could not order a phased withdrawal of nitrite if it causes cancer, but they would have to impose a complete ban without considering nitrite's benefits. The USDA and FDA felt a sudden ban would pose a risk of botulism to the public. Congress was faced with the question of whether or not it should change the law, the Delaney amendment, requiring a ban on any food additive shown to cause cancer.

After the recent reevaluation of the nitrite data, Rep. William C. Wampler (R-Va.) called a press conference to ask Congress to adopt a new procedure for evaluating food additives. He charged federal regu-

lators with using scare tactics in premature announcements that cause "near chaos" in industries affected by "these on-again-off-again regulatory announcements."

Even if nitrite does not cause cancer directly, it remains suspect on health charges. Nitrites can be converted during cooking or in the body to nitrosamines, which are known carcinogens. The FDA and USDA say they will continue their efforts to eliminate nitrosamines from foods. In addition, the pathologists point out that two very recent reports conclude that nitrite-fed rats have higher tumor incidences than do control animals. Those reports are now being reviewed by the Bureau of Foods. □

## Put out the fire of fire ants



Fire ant colonies build 2- to 3-foot-high mounds that house hundreds of thousands of ants. They swarm out of the hive at the slightest provocation.

Photos: USDA

Fire ants began marching through Georgia in the 1930s after they were accidentally introduced into that state. And the pests, named for their fierce sting, have continued to march. They now infect 230 million acres in nine southeastern states, and they are spreading at a rate of approximately 30 miles per year. The insecticide mirex had been used to fight the ants, but it was banned in 1978 after it was found to be carcinogenic, to cause birth defects and to accumulate in the environment. Now there is new hope that the march of the fire ants can be halted. The Environmental Protection Agency has approved an insecticide called Amdro for use in wide area ant control programs.

Amdro belongs to a new class of chemical compounds called amidinohydrazones. Scientists at American Cyanamid Co. developed and tested more than 500 such compounds before hitting upon Amdro, which is applied to pastures, range grass, lawns, turf and non-agricultural lands (4 to 6 grams are distributed per acre). Because Amdro must be carried back to the mound by foraging worker ants if it is to be effective, it must be applied when soil temperature is more than 60° F and when the ants are active.

The fight against fire ants (also known as imported fire ants) is serious because they are more than picnic pests. They threaten both human health and agricul-

ture. In 1979, for instance, one Georgia county treated more than 28,500 sting cases, says Joseph J. Garbarino of American Cyanamid. A fire ant sting produces a burning sensation, and the resultant itchy pustule can become infected. A fire ant can sting repeatedly, and victims are usually attacked by many ants at once.

Farmers suffer economic losses not only because of the ants but because of their mounds, which may be 18 inches high, 2 feet in diameter and house 250,000 ants. Livestock avoid the mounds, thus reducing grazing land. The mounds damage mowers, balers and other farm equipment so large sections of fields cannot be harvested mechanically. In addition, bales of hay left on the ground overnight cannot be handled because of already resident ants. The ants attack and sometimes kill young livestock and ground-nesting birds.

Short-term laboratory tests indicate that Amdro doesn't cause genetic changes or birth defects. Long-term studies are currently underway. Calvin Alvarez of American Cyanamid says their studies indicate Amdro doesn't accumulate in the food chain or in the environment, but instead is degraded by sunlight and by soil microorganisms. The insecticide has already been tested on approximately 100,000 acres of land, and Cyanamid hopes to sell enough insecticide to treat 1.2 million acres this fall. □

## Unlocking buried geothermal energy

A unique form of geothermal energy lies deep in a part of Texas. Whether it can be used efficiently as an energy alternative is a question Myron Dorfman and colleagues at the University of Texas at Austin have set out to answer.

Dorfman and co-workers are investigating subsurface waters trapped at abnormally high temperatures and pressures. These aquifers eventually may be not only a third source of geothermal energy — hot-water and dry-steam fields are the two conventional forms of the earth's heat energy currently being tapped — but also a source of natural gas: The geopressed waters contain a significant quantity of dissolved methane. Although a 16,500-foot geopressed well was drilled last year to test the feasibility of gas recovery and geothermal energy production from these waters, an ownership change-of-hand forced the then only 10-day-old investigation to cease. Now the business barrier has been removed and tests are due to resume, reported Dorfman at the American Chemical Society meeting last week in Las Vegas, Nev.

The test well, about 35 miles south of Houston, sits on one of the largest geopressed zones in the world — one that underlies a large portion of the northern shore line of the Gulf of Mexico. Dorfman says there are seven other such basins in the United States and 42 in other countries. These geopressed zones are primarily the result of compaction phenomena: Newly deposited, water-saturated sediments eventually are covered by younger sediments. As the water-saturated rock is buried deeper, it begins to expel water; if the overlying rock is impermeable the water is trapped, and the weight of the rock keeps this water at higher than normal pressures. Underlying shales are believed to be the source of the methane in these geopressed aquifers.

Mathematical calculations indicate that the test well is capable of pumping 40,000 barrels of water per day, from which 1 million cubic feet of gas could be extracted. The total amount of recoverable natural gas in the geopressed aquifer is 200 to 250 trillion cubic feet. Known reserves of conventional natural gas in the United States are about 200 trillion cubic feet.

But, says Dorfman, "We can do paper studies all day long," and the figures "will mean nothing. That is why we have set out to study long-term [field] tests."

One field test will focus on determining the most efficient use of the hot waters. The aquifer waters — at temperatures 200° to 300°F lower than dry-steam and hot-water fields — may be cooler than what is necessary with present-day technology to yield geothermal generation of electricity. Other tests will assess the en-