ENVIRONMENT

Uranium mill contaminates groundwater

Environmentalists and the governments of at least two states are concerned about groundwater contamination from uranium-mill tailings, according to the Dec. 10 NUCLEARFUEL. Tailings are naturally radioactive low-level wastes that result from milling operations.

Although the Western Nuclear split-rock mill in Wyoming is contaminating groundwater through seepage from tailings ponds at the rate of 1,180 gallons per minute, the Nuclear Regulatory Commission has proposed sacrificing groundwater quality because degradation "is not significant enough to warrant discontinuing use of the existing impoundment and creating another impoundment elsewhere," according to an environmental-impact statement it prepared for the mill's license renewal. The state provisionally agrees, although officials believe additional controls may be needed to confine the contamination. Environmentalists want contamination stopped, something that could require moving 11 million tons of tailings.

The mill, which began operation in 1957, is expected to operate for another 20 years. Seepage from tailings is expected to continue throughout that time, although rates will drop when mill operations end. NRC says no contaminated water has migrated from the site, nor will it during the next 20 years. At least one state official, however, told NUCLEARFUEL that "we weren't really happy with the old monitoring program and aren't sure that the contaminated water is contained."

The same issue reports that the license for Bokum Resources Corp.'s Marquez mill in New Mexico may not be approved because it has yet to submit what NRC and state officials believe is an adequate plan to ensure tailing wastes won't contaminate groundwater.

Be careful with yuletide wrappings

Colored gift-wrapping paper should be kept out of the reach of small children who might eat or chew it, say John R. Bertagnolli and Sidney A. Katz of Rutgers University. They studied 17 wrapping papers and found 14 contained high levels of lead, and sometimes chromium, zinc or copper.

No regulations prohibit or limit use of toxic metals in paper pigments, they say. As a result, lead chromate is used to color paper yellow, copper compounds to color it blue and chromates to make it green. High levels of lead in four samples may be due to red lead, the scientists say.

Burning paper in a fireplace or municipal incinerator after the holidays may spread the problem — into the air. And groundwater can leach the chemicals from landfills. The researchers found that a slight acid solution — similar to southern New Jersey groundwater — leached out significant levels of the metals easily.

Cigarette equivalent of air pollution

Nonsmokers ingest from food, water and air they breathe a "baseline level" of cancer-causing agents equivalent in health effects to smoking 2.15 cigarettes per day. And most of the carcinogens come from air (in the form of industrial pollution, auto emissions, etc.), not from food or water, according to Robert Handy, a scientist with Research Triangle Institute in North Carolina. The bad news is contained in a report, "Estimation of Risk from Carcinogens in Drinking Water," prepared for the Environmental Protection Agency. Using data collected prior to 1972, Handy revised estimates of air-pollutant risks from an earlier report he coauthored. Among assumptions in the newer one — and reported in RTI's September-October HYPOTENUSE — is that carcinogens are just as likely to cause cancer when ingested as when inhaled as cigarette smoke.

EARTH SCIENCES

Susan West reports from San Francisco at the fall meeting of the American Geophysical Union

Palmdale Bulge: The continuing saga

So much for a quick survey of the Palmdale Bulge. Last January, more than $1.4 million and 42 teams from a variety of city agencies in Southern California were dispatched for a three-month survey of the ground levels and gravitational variations in the anomalously uplifted area near the San Andreas fault called the Palmdale Bulge (SN: 1/7/78, p. 4). Somehow, the three months have stretched to nearly a year.

Part of the problem, John D. Bossler of the National Geodetic Survey told SCIENCE NEWS, is that the data were not collected in a consistent way. Some were recorded on magnetic tape, some on paper.

More serious, however, are problems with the measurements. When geodesists level a particular area, the sum of all the measured elevation changes, negative for down and positive for up, should equal zero. This is called closing a loop. In the Palmdale survey, says Bossler, a few of the loops don't close, indicating some areas may not have been measured or were measured incorrectly.

Even so, the preliminary results "indicate that the survey was worthwhile," he says. Several local areas of activity have been pinpointed and can now be more closely watched, he says. The final results of the survey are expected early next year.

Settling the ocean tilt tiff

Here's something to make you sleep easier: At last geodesists and physical oceanographers agree — essentially, at least — on the slope of the sea level along the west coast of the United States. Bruce Douglas of the National Ocean Survey presented a paper that may settle the half-century-old dispute.

Since a survey in the 1920s — measured from ground stations along the shore — geodesists maintained that the level of the Pacific Ocean slopes toward the south. Oceanographers, from measures of ocean circulation and physical data gathered at sea, found no such tilt. A 1969 geodetic survey found a 65-centimeter slope between San Francisco and San Diego. Oceanographers found none. The difference is far too great to be caused simply by using two different methods, Douglas says.

However, a 1977 to 1978 geodetic survey found only a 15-cm slope between the two cities. This result, Douglas says, is in "essential agreement" with the oceanographers' findings.

Why the change? Earlier geodesists just might not have been quick enough, he says. Previous surveys took nearly a year; the reconciling survey took only a few weeks and used a more direct route.

Clocking continents

Richard G. Gordon of Stanford University described a new method of determining the speed of continental drift. Other methods, such as one that depends on ancient plate boundaries, are limited by lack of materials to the past 100 million years. Gordon's work, which uses paleomagnetism, is good as far back as there are rocks available. Based on the positions of the ancient magnetic poles, Gordon and co-workers determined the possible movements of a continent that would have produced the telltale orientations of the magnetic grains in its rocks. For example, if the magnetic pole remained in one place and a continent rotated around it, the magnetic orientation of the rocks would change and the continent's path could be traced. The researchers chose the path that would have moved the continent least and determined the minimum velocity necessary to make the journey. They found, for instance, that 200 million years ago, while it was still attached to Eurasia, North America moved faster — 2 centimeters per year — than it does now.