Energy

Regional dumps for low-level radwaste

States in more than half of the country will likely have no place to dispose of slightly radioactive trash when a 1986 federal deadline takes effect, says a General Accounting Office report to Congress. The Low-Level Radioactive Waste Policy Act, passed in December 1981, gave the states the responsibility for disposing of contaminated materials like paper, protective clothing and other items used in laboratories, hospitals, power plants and various industries. Such low-level nuclear wastes generally pose a health danger for no longer than 100 years and are usually buried in shallow land sites. Today, all of the nation's commercial low-level wastes go to sites in Nevada, South Carolina and Washington, but the capacity of the sites is limited in the face of the growing volume of low-level waste and the objections of the host states to becoming "the nation's nuclear dumping grounds."

The law encourages states to form interstate compacts and construct regional disposal facilities. It also establishes Jan. 1, 1986, as the date when a congressionally approved interstate compact can exclude nonmember states from using its disposal facilities. The GAO report says, "While progress is being made, it is likely that only two regions (the Northwest and Southeast) will have operating disposal sites by the ... target date." Other new disposal sites probably will not be ready to operate until sometime between 1988 and 1990.

The report suggests that the government can either extend the deadline or open 13 existing Department of Energy disposal sites (used for low-level radioactive wastes from military programs) to commercial wastes. However, these options "could discourage the states from quickly seeking their own solution to the low-level waste problem," the report contends. Instead, GAO recommends that the three existing commercial sites remain open to all states or that the wastes be stored temporarily in "centrally located, warehouse-like facilities."

A repository for high-level radwaste

Step by step, the intricate requirements of the Nuclear Waste Policy Act (SN: 1/1/83, p. 6) are being implemented. The result will be the construction of the nation's first high-level radioactive waste repository by 1998. The U.S. Department of Energy (DOE) is proposing nine sites for further investigation as potential repository sites. These include a basalt rock formation at the Hanford nuclear reservation in Washington, a tuff formation at Yucca Mountain on the Nevada Test Site, bedded salt in two Utah canyons, two bedded salt formations in the Texas Panhandle, the Richton and Cypress Creek salt domes in Mississippi and the Vacherie salt dome in Louisiana (SN: 1/2/82, p. 9).

DOE has just completed a series of public hearings in the vicinity of each of the nominated sites. This summer, after issuing guidelines for the selection of a repository site and consulting with the governors of the affected states, DOE will nominate at least five sites for detailed study. In the fall, the agency will recommend three of the nominated sites to the President.

Financial woes for synfuels plant

Only two major efforts to convert raw materials like coal and oil shale into natural gas and other synthetic fuels have survived high construction costs and depressed oil prices (SN: 1/8/83, p. 24). Now, despite staying within its construction budget, one of the survivors, the half-built Great Plains coal gasification plant in North Dakota, faces financial problems too. Recently, partners in the consortium building the plant told the Department of Energy that they may be unable to repay a federal, $2.02 billion loan in the time required. When the plant is completed in 1984, the price of its synthetic natural gas will be tied to the price of home heating oil, but the builders now expect the allowed price will be significantly lower than the cost of producing the fuel.

Earth Sciences

Buried fault blamed for Coalinga quake

In the aftermath of the Richter magnitude 6.5 earthquake that jolted Coalinga, Calif., May 2, scientists are working to understand the event, the magnitude and details of which surprised nearly everyone. After the initial shock, which was centered about six miles beneath the earth's surface, scientists visited the area to look for signs of surface rupture and ground failure. Such effects would be expected to result from a sizeable quake along a strike-slip fault, such as the San Andreas, 20 miles west of Coalinga. But there is no sign of surface rupture, and the United States Geological Survey in Menlo Park, Calif., now reports that the quake instead may have occurred along a previously unknown buried fault, tens of millions of years older than the San Andreas. The ancient fault is known as a thrust fault, and movement along it occurs as one slab of the earth's crust is pushed over another in a shallow slope rather than the near-vertical movement common along the San Andreas.

The devastating primary rupture was followed by thousands of aftershocks. Two large ones happened on May 8, with magnitudes of 5.1 and 4.5, USGS reports. The aftershocks, which occurred about three miles under the surface, are the earth's attempt to readjust after the movement generated during the initial rupture. By pinpointing the locations of the aftershocks, scientists have been able to determine that the fault movement encompassed an area roughly 20 miles long by six miles wide, with the locus of the main shock at its center. Creep meters that measure fault displacement on the San Andreas, in Parkfield, show recent movement of 0.2 inches or more that may have been caused by the Coalinga earthquake.

Mass extinctions: A fact of life

As many as 70 percent of algal forms on earth died out 650 million years ago in the earliest known mass extinction. The finding, reported by Andrew H. Knoll of Harvard University in Cambridge, Mass., and Gonzalo Vidal of Lund University in Sweden, is based on studies of the algae in rocks found in Scandinavia, the Baltic region, eastern Greenland and, most recently, Australia. At each location the majority of algal species disappear from rocks deposited during the late Precambrian period, indicating to the researchers that the extinction was worldwide. The discovery extends the increasing evidence that mass extinctions are an evolutionary fact. Last year David M. Raup of the Field Museum of Natural History in Chicago and John Sepkoski of the University of Chicago reported that their statistical analysis of the marine fossil record revealed at least four mass extinctions.

Knoll says the importance of these extinction events is that "extinction, particularly mass extinction, may be more important in determining large patterns in evolutionary history than people previously had thought." Even though organisms become adapted to their environment, he says, nothing becomes adapted to the effects of rare events that may occur only every 100 million years, such as the hypothesized asteroid impact that has been linked to the mass extinction at the end of the Cretaceous period 65 million years ago (SN: 10/9/82, p. 231). There is nothing adaptively superior about the survivors, but they survive and diversify, and become the next important group. Fossils after the extinction are abundant, he says, but there are many fewer species. It is also possible, he adds, that the algal groups that became important later had a different origin than those that became extinct, because algae originated several times. Soon after the Precambrian extinction, the multicellular, soft-bodied animals (Ediacaran metazoans) appeared (SN: 5/7/83, p. 300). If there is any connection between the timing of the events, it might be the massive ice age that occurred about 650 million years ago, Knoll says. While such a link is speculative, he says, the Ediacaran metazoans found so far have all been in rocks deposited since the last ice age of the Precambrian.