

Controversy Over Nuclear Evacuation Planning

The Nuclear Regulatory Commission (NRC) has historically interpreted the Atomic Energy Act as giving the agency the exclusive authority to license and set safety standards for nuclear plants. For the past six years, however, state and local governments have effectively been able to exercise veto power over the startup of new nuclear power plants, merely by failing to develop or approve emergency-evacuation plans for residents within 10 miles of such plants.

This de facto veto power enables state and local governments to impose their own, separate licensing standards on plant owners. NRC officials last week proposed removing such power by eliminating the 1980 requirement that nuclear plant licensing be contingent upon state and local government participation in emergency-evacuation planning. Though the proposal has been applauded by nuclear utilities, it is raising protests from lawmakers at all levels of government.

A number of Massachusetts legislators, for example, see the new NRC proposal as a challenge to states' rights, which have already been tested by their governor, Michael Dukakis. Though the completed Seabrook nuclear plant resides in New Hampshire, some Massachusetts residents live only about two miles away. On Sept. 30, 1986, Dukakis refused to approve its evacuation plan when he decided he could not be sure his residents could be evacuated to safety during a severe accident. This has prevented the plant from obtaining an operating license.

But the new NRC proposal would allow the New Hampshire utility that owns Seabrook to certify Massachusetts's ability to safely evacuate its residents — a clear usurpation of states' rights, according to State Rep. Lawrence R. Alexander, House chairman of the Massachusetts legislature's Joint Energy Committee.

Sen. John R. Kerry (D-Mass.) agrees. Explains Kerry's legislative assistant, John Dukakis (the governor's son), "State and local governments are really the only [ones] who can judge whether public safety can be protected in an emergency." Kerry, he says, may challenge the idea that responsibility for nuclear safety should remain an exclusive domain of the federal government.

A bill Kerry introduced last month would amend the Atomic Energy Act so that nuclear plant licenses could not be granted without the written approval of each governor having constituents within a plant's 10-mile emergency-evacuation planning zone (EPZ). Moreover, the bill would prohibit reducing the EPZ for existing plants and would mandate a minimum EPZ of 10 miles for new plants.

The EPZ-reduction issue was prompted by a Dec. 18 petition to NRC by Seabrook's owners. In it, they argue that the plant's superior safety design warrants cutting its EPZ from 10 miles to 1 mile — a move that, not coincidentally, would cut out Massachusetts's role in Seabrook's holdup.

Similar bills have been authored by Sen. Gordon Humphrey (R-N.H.) and Sen. Daniel P. Moynihan (D-N.Y.). However, unlike Kerry, Humphrey and Moynihan see the NRC proposal as a bigger challenge to nuclear safety than to states' rights. Humphrey has noted that even

NRC has argued that emergency planning should be considered in addition to, rather than in lieu of, engineered safety.

Adoption of the current NRC proposal requires only the approval of a majority of NRC's commissioners. However, many on Capitol Hill suspect that final approval of such a measure might galvanize congressional action to rewrite the Atomic Energy Act in such a way that states would be handed back the veto power NRC would take away. NRC officials this week declined to comment further on the matter.

— J. Raloff

Signs of Nemesis: Meteors, magnetism

A well-known hypothesis blames impacts of comets — triggered by Nemesis, the alleged companion star to the sun — for mass extinctions of biological species that appear to have occurred periodically in the history of the earth. In the attempt to show that such cometary impacts did happen, proponents of this hypothesis are marshaling evidence from other events that might have been the result of an enlarged presence of comets in the inner solar system at the appropriate times.

The latest piece of such evidence concerns the ages of the so-called H class of chondritic meteorites. It was presented in San Francisco, at the recent meeting of the American Physical Society and the American Association of Physics Teachers, by Richard A. Muller of the Lawrence Berkeley (Calif.) Laboratory (LBL).

The H class are the chondrites with a high iron content. The work by Saul Perlmutter of LBL and Muller indicates a periodicity in the ages of the H chondrites that coincides with the times of mass extinction.

The meteorites are presumed to be pieces broken off asteroids, by the impact of another asteroid or perhaps a comet. It turns out that large numbers of such meteorite liberations bunched up at or near the times of the mass extinctions. The cause of such wholesale meteorite formation, the researchers suggest, could be showers of comets moving through the asteroid belt — the same comets that, hitting the earth, triggered the climate changes necessary for mass extinctions.

The climate changes that would have been caused by the comet showers could also have brought about reversals of the earth's magnetic field (SN: 3/29/86, p.197), according to an analysis published by Muller and Donald E.

Morris of LBL in the November GEOPHYSICAL RESEARCH LETTERS. There is evidence, although some call it statistically marginal, that the rate of geomagnetic reversals peaked during the mass extinctions. The comet hits would produce debris and smoke from widespread fires, darkening the atmosphere and creating the climatic condition that has become known as nuclear winter.

Besides extinction of species, this comet winter would cause increases in the glaciation of land areas near the poles, and consequent sudden drops in sea level. Calculation shows that such changes could be enough to alter the rotation of the earth. The change in rotation speed would cause a shear in the liquid layer that lies between the core and mantle of the earth. The shear would disrupt the rolling convection currents in that liquid that produce the earth's dipole magnetic field, destroying the dipole and leaving magnetic confusion behind. Later, when things stabilized again, the dipole would return, but it might return with reversed polarity. Every comet shower need not produce a magnetic reversal. In particularly warm periods they would probably not cool the earth enough.

Finally there is Nemesis, the ultimate cause of all this. Nemesis would be in such an orbit around the sun that it would periodically disturb the Oort cloud — the collection of cometary material orbiting the sun at about 100,000 times the earth's distance — and would trigger a comet shower.

Under the direction of Carl Pennypacker of LBL, an automated telescope patrolling the sky for supernovas is also looking for Nemesis. If it is among the 3,000 candidates the fully automated system will search, Muller is confident the program will find it within a few months.

— D. E. Thomsen