



AEC

The AEC plans to bury canisters of nuclear wastes in an abandoned salt mine near Lyons, Kan.

The Kansas geologists and the AEC

AEC plans for a nuclear repository are meeting scientific opposition

With the growth in the number of nuclear power plants comes the problem of how to dispose of the radioactive wastes they create. For some time the Atomic Energy Commission has been seeking repository sites for the wastes, and on the recommendation of two studies by the National Academy of Sciences it decided last year on an abandoned salt mine near Lyons, Kan. In its budget for fiscal 1972, the AEC accordingly requested \$3.5 million to begin work on the planned repository.

But the plan has met with opposition from Kansans fearful of the possibilities of contamination of their land, water and air from the stored wastes. The Kansas State Geological Survey asked the AEC to delay its plans until adequate studies could be made of their safety (SN: 8/8/70, p. 115).

Last August, the Survey, headed by Dr. William W. Hambleton of the University of Kansas, began studies of the surface geology, ground water hydrology and subsurface geology of a nine-square-mile area surrounding Lyons. The researchers recovered two deep cores from opposite corners of the proposed 1,000-acre site, one of which penetrated through the salt to a depth of about 1,300 feet. They also drilled some 40 shallower holes.

The Survey's preliminary report is highly critical of the AEC, accusing it of giving insufficient consideration to several serious problems.

The report tentatively concludes that the geologic conditions of the site are satisfactory. But problems relating to heat flow and surface subsidence remain largely unsolved, it says, and AEC models for solution of the problem have been based on simplified theoretical conditions, rather than on the actual geology of the mine area.

The interaction of subsidence, thermal expansion and heat flow, the Kansas scientists found, could break the seal of overlying rocks permitting entry of ground waters that form the primary water source for the area.

The waste containers would eventually deteriorate, but according to the AEC plan the salt itself would act as the primary container for the wastes. The AEC says the earth pressures and thermal effects of the waste would cause the salt to close about the containers and seal them in place.

The Kansas geologists, however, see dangers in this plan. Studies of radiation effects on salt show high heat storage, they say. Rapid thermal excursion from sudden release of this stored energy could cause temperatures in the affected region to rise to 620 degrees C. "These high temperatures," according to the report, "could result in greater flow of salt around the containers, and could cause an explosive effect due to this sudden thermal expansion." These effects could cause the containers to migrate to lower depths, possibly to shale layers, and could create faults in overlying rocks, the report claims.

Furthermore, the geologists point out, the metal containers are expected to deteriorate within six months, and the ceramic material containing the wastes will last only several years. Radioactive particles could therefore migrate through the salt. The ceramic material itself, the researchers say, can store energy, and gamma radiation can cause chemical breakdown of salt. Radiolysis could result in formation of new chlorine compounds capable of leaching plutonium.

The AEC, the report concludes, has "exhibited remarkably little interest" in the heat-flow problem and in studies of radiation damage.

One of the more vocal critics of the AEC plans has been Rep. Joe Skubitz (R-Kan.). An exchange of letters between Skubitz and AEC Chairman Glenn T. Seaborg, in which Dr. Seaborg apparently failed to satisfy Skubitz' objections, culminated last month in a letter from Skubitz to Kansas Governor Robert B. Docking. Citing the "paucity and unsureness of facts by those who are scientifically best informed," Skubitz urged state officials to oppose "making Kansas an atomic garbage dump."

Dr. Seaborg responded to these charges on Feb. 23 with a point-by-point rebuttal. "The Commission," he said, "has no intention of burying wastes in this facility until all the pertinent data are available to support the safety of this operation."

On the question of retrieval of wastes, Dr. Seaborg said that once radioactive wastes are placed in the repository, retrieval would be considered only in case of safety problems which at present the AEC does not foresee. However, he added, the facility would be designed to allow retrieval.

Studies will continue, Dr. Seaborg said and "as we proceed, if exploratory studies were to develop objective data which raise serious questions as to the suitability of the site for radioactive waste storage, the Commission would cease work on the project. To date, we have no reason to believe that this important project should not proceed if authorized."

Final agreement on the location of the nuclear repository site will have to await settlement of these differences between Kansas geologists and the AEC. The situation seems increasingly typical of many problems in today's technological age: Both sides cite scientific evidence to reach opposite conclusions. □

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