

Legality of new NRC rule is challenged

As expected, the Nuclear Regulatory Commission (NRC) voted late last month to enact a rule change that will allow the licensing of nuclear power plants without state or local participation in emergency planning (SN: 10/31/87, p.279). The rule change is designed to break the deadlock caused by some authorities' refusal to participate in the emergency planning process. Their refusal has stalled the licensing of the Seabrook, N.H., and Shoreham, N.Y., nuclear power plants.

Unexpectedly, however, the commission made some last-minute changes in the wording of the rule — changes that some groups say are illegal. The changes were made in the final days before the NRC vote, and well after the period for public comment had ended. Normally, such changes are published in advance in the Federal Register to allow at least 30 days for public comment.

At issue are details of the NRC's "realism doctrine." As originally worded in an Oct. 13 NRC briefing paper, the realism doctrine assumed that in the event of an emergency requiring evacuation, state and local authorities "would do their best to protect the affected public." It made "no assumption," however, that officials would follow a utility company's particular emergency plan.

According to NRC spokesperson Sue Gagner, however, the final rule assumes that authorities "will use the utility plan." The change represents a significant loss of sovereignty for authorities in the vicinities of the as-yet-unlicensed Seabrook and Shoreham plants. Those officials have refused to submit emergency evacuation plans, claiming that such large-scale evacuations cannot realistically be accomplished.

"The NRC made the change without any notice whatsoever, and in response to communications from certain members of Congress," says Larry Lanpher, a Washington, D.C., attorney representing Suffolk County, N.Y., in its fight to prevent licensing of the Shoreham plant. "The NRC, without taking any public comment, inserted this whole new provision at 11:59. That's not reasoned or lawful decision making."

Frank Ingram, an NRC public affairs officer, told SCIENCE NEWS that the new wording more accurately reflects the NRC's concept of the realism doctrine. He said he wouldn't speculate on legal challenges that might result from the last-minute change.

"This thing will end up in court," says Ellyn Weiss, of the Union of Concerned Scientists, a Washington, D.C.-based advocacy group. "There will be many people suing the NRC, probably including us."
— R. Weiss

Metabolism studies predict obesity

Common sense might say that a "slow" metabolism makes a person more likely to become overweight. While scientists have found this a difficult notion to confirm, one group has shown that a low metabolic rate is indeed a risk factor for significant weight gain among obese Indians of southern Arizona. Earlier work by the same group suggests not only that an individual has his or her specific metabolic rate, but also that this rate might be inherited.

Despite repeated weight-loss programs, the average weight of the Pima Indians is roughly 30 percent heavier than that of the U.S. Caucasian population. Scientists at the Phoenix facility of the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) are studying this general obesity using a specially designed "respiratory chamber" to measure metabolism. During a seminar last week, program leader Clifton Bogardus III reported the results from various studies on several hundred Pima individuals.

In the latest study, the scientists have determined tribe members' probability of gaining 7.5 kilograms over a two-year period. They conclude that the risk of gaining the extra weight is about 70 percent for persons with a low metabolic rate, compared with only 10 percent to 30 percent among those with normal or high rates.

"A low metabolic rate over a 24-hour period is a significant predictor of obesity," says Bogardus. "But it's not the only factor."

Based on a Swiss design, the group's custom-made respiratory chamber could help explain the complex relationships between metabolism and obesity. Subjects are placed in a sealed room for 24 hours, and the amount of oxygen they inhale and carbon dioxide they produce is measured. When those figures are computed on the basis of food eaten during the test, researchers are able to calculate the so-called 24-hour energy expenditure, which Bogardus says is a measure of the body's metabolic rate. An individual's 24-hour score in the chamber is "an incredibly reproducible thing," says Bogardus.

Because food consumption is not the only determinant of weight, a radar system in the chamber detects the spontaneous movements of subjects sitting and walking in the 2.5-by-3.3-meter room.

"Somewhat to our surprise," says Bogardus, "we found that the activity . . . in the chamber varied widely [from one person to another]." This "fidgeting" can burn an extra 100 to 800

kilocalories a day, depending on how active a person normally is while "at rest." The NIDDK group reported in 1986 that differences in fidgeting accounted for the variability of 24-hour energy expenditures between individuals.

Certain fidgeting levels also were characteristic of individual families, supporting the idea that obesity is an inherited problem. Members of one family may spend 6 percent of their time in the chamber fidgeting, compared with another family's 12 percent, says Bogardus. Some families' energy expenditures may vary from those of others by 450 kcal each day. "That is a lot of calories added up day after day after day," he says.

Thus far, scientists have not been able to describe the relationship between planned physical exercise and any real changes in the metabolic rate. In future studies, in which subjects will drink water labeled with minute amounts of radioactivity, the Phoenix group hopes to measure the amount of water metabolized during normal and strenuous exercise outside the chamber.

Besides providing information on obesity that Bogardus thinks is applicable to the general population, Pima studies provide insight into the development of diabetes, as well as how culture may affect health. Researchers at the Phoenix facility have been studying the unique health problems of the tribe for about 20 years. There are approximately 5,000 Pima Indians living on a government reserve near Sacaton, Ariz. The Pimas had been farmers there for about 2,000 years — part of a culture subject to periodic droughts and famines, events that kept them relatively slim. But with the advent of federal aid and lifestyle changes, they "went from living off maize . . . to what they could make from flour and lard [from the government]," says Bogardus.

As a result, he says, obesity has become "rampant" in the tribe over the past few decades, "associated with considerable morbidity, in particular their incredible prevalence rate of non-insulin-dependent diabetes." Nearly half the Pima adults over the age of 35 have this form of diabetes. Both obesity and genetics are considered risk factors for the disease. Therefore, scientists are using the respiratory chamber and a barrage of other tests to determine what it is about the offspring of diabetic parents that might predict the later appearance of diabetes. Starting this month, researchers at NIDDK's Bethesda, Md., facility also will use computed tomography on individual Pimas to study brain receptors for insulin.

— D.D. Edwards