EPA Cites Errors in AEC's Reactor Risk Study

The Environmental Protection Agency (EPA) says that a recent study of nuclear accident risks by the Atomic Energy Commission (AEC) underestimated the number of likely deaths and illnesses from a catastrophic reactor failure by a factor of 10. In a critique prepared for the AEC, the EPA cites several instances of what it calls "misrepresentation" of a key reference on radiation effects, the 1972 report of the National Academy of Sciences' Committee on the Biological Effects of Ionizing Radiation (BEIR). Each of the several misreadings of the BEIR report had the effect of lowering the predicted number of deaths and illnesses that might eventually result from a large release of radioactivity.

Radiological effects—acute illness and death, latent cancer and thyroid disease, and genetic abnormalities—were thus underestimated by a collective factor of 2 to 5, the EPA contends. Compounding this error were "overly optimistic" assumptions about the efficiency with which thousands of persons could be evacuated from hundreds of square miles around an out-of-control reactor. These two sources of error gave rise, the EPA said, to calculations of human health effects of large accidents that are low "by about an order of magnitude."

The risk study was directed by Norman C. Rasmussen, a professor of nuclear engineering at the Massachusetts Institute of Technology, although most of the work was performed by the AEC and its national laboratories. The AEC is using the study to support its claim that nuclear risks are relatively small, while nuclear critics are seeking both to poke holes in the study and to use its findings to undercut the federal Price-Anderson Act, which limits utilities' accident liability. The Rasmussen report and the Price-Anderson Act, which expires in 1977, will probably be the focal points of lively hearings next year in a Congress increasingly sensitive to nuclear controversies. The EPA's criticism will surely fuel that fire.

The EPA called the commission's analysis of accident consequences "quite weak" but said that it could not tell how these weaknesses might affect overall conclusions about nuclear risks. EPA's review did not make clear whether it meant what the word "misrepresentation" implied, but EPA officials later said no pejorative meaning was intended. As of early in the week AEC officials still had not seen the environmental agency's frosty commentary and thus could not respond in detail. Project staff director Saul Levine, however, strongly denied that fudging had occurred. Instructions to everyone concerned, Levine told *Science*, were to "follow the facts where they led and not to minimize the consequences."

Among other things, the environmental agency says the AEC appears to have ignored the economic costs of human health effects, as well as radiological effects on the 2.2 percent of the population in utero. In one instance the Rasmussen report represents the academy's BEIR report as having calculated the upper limits of health effects from a given radiation dose; in fact the BEIR report says its numbers may be "too high or too low."

The nuclear risk study took more than 2 years to complete and cost some $3 million (*Science*, 6 September). It was the AEC's first attempt to predict systematically the many possible trains of events leading to a serious accident and to calculate the probabilities as well as the consequences of such accidents. One major conclusion, quickly put to the service of public relations, was that the chance of a major reactor accident—one large enough to kill 100 or more persons—was far smaller than the chance of an air crash of similar magnitude.

Overall, the EPA says in its critique, the study represents an "innovative step forward" in risk analysis that appears to provide a "meaningful basis for judging the acceptability of [nuclear reactor] risk."

But the EPA criticizes the commission for overplaying the relatively small risk of nuclear accidents in a manner likely to be "misleading" to the average reader. One claim emphasized in a summary volume prepared for the general public, for example, is that being killed by a reactor gone awry is about as likely as being hit by a meteor. EPA officials regard this as something of an apples-and-oranges analogy. Comparison of risk is said to be only one of many elements to be considered in judging the acceptability of nuclear power, yet the AEC's emphasis on comparisons "will certainly imply an acceptability judgment to the average reader."

Levine, the study's staff director, said the summary volume explicitly noted that the AEC was making no final judgments on the acceptability of potential nuclear risks. "If the risks are small, then we at least ought to say so and let the facts speak for themselves," he said.

As for the order of magnitude error in health effects claimed by the EPA, Levine noted that the detailed report does acknowledge a range of uncertainty of plus or minus a factor of 3. He was skeptical that an error larger than this could be substantiated.

EPA's criticisms in some ways paralleled those released in a Washington news conference on 23 November by the Sierra Club and the Union of Concerned Scientists (UCS), the small but effective locus of technical support among nuclear critics. The Sierra Club and the UCS, in a 170-page analysis, contended that the AEC had misused the academy's radiation report and had underestimated potential deaths and injuries from a large accident by a factor of at least 16. The environmentalists went beyond the EPA, however, in contending that the methods of statistical analysis used by the AEC cannot reliably predict the absolute probability of events that have never before happened. To look into this question the EPA has let an $88,000 contract to Intermountain Technologies, Inc., a consulting firm in Idaho.

None of this is likely to improve the chilly relations that have developed between EPA and its sister agency. Nor is a second critique of the AEC released last week. The EPA gave a rating of "inadequate" to the commission's environmental impact statement on its nuclear waste disposal plans and said the AEC seemed to have its priorities upside down, emphasizing construction of an "interim" surface storage facility over development of an ultimate means of disposal.—R.G.