Letters

Hazardous Waste Sites

In his editorial "Cleaning hazardous waste sites" (1 Dec., p. 1097), Philip H. Abelson states that more than 31,000 inactive or abandoned hazardous waste sites have been identified, but that only 1224 have been placed on the National Priorities List (NPL). Sites are placed on the NPL primarily on the basis of their score on the Hazard Ranking System (HRS), a numerically based system designed to evaluate the relative risks posed by a site to human health or the environment. The vast majority of the 31,000 identified sites have already been assessed, and most have been deemed not appropriate for inclusion on the NPL. After initial studies, the Environmental Protection Agency (EPA) has determined that no further action by the federal government is required at 17,000 of these sites. Roughly 11,000 additional sites have been initially assessed or studied, but further study is required. The true problem potential of all sites is assessed within 1 year of their identification.

While remedial action has been initiated at only about 250 of the 1224 NPL sites (261 as of 30 September 1989), removal action has been taken at 300 NPL sites in order to address immediate or near-term risks. The vast majority of the remaining sites are in the investigation phase of the remedial process. In order to ensure that those sites that have not yet entered the federal cleanup process are in fact safe, EPA has recently completed a field assessment at every such site. EPA is in the process of taking an additional 25 removal actions at NPL sites in this fiscal year to ensure that sites are safe while awaiting remedial action. This does not include the 200 emergency response actions we conduct each year.

Although EPA's progress in implementing the Superfund program has not met the expectations of Congress or the public, the pace of site remediation has accelerated significantly in recent years: remedial actions have been initiated at 261 sites; an additional 109 sites have reached the remedial design stage; and remedy decisions have recently been made at another 76 sites after completion of detailed site studies. It is important to realize that 61% of the remedy decisions, 74% of the designs, and 70% of the construction starts (remedial actions) have been accomplished since the October 1986 enactment of the Superfund Amendments and Reauthorization Act.

A reference to EPA Administrator William K. Reilly's evaluation of this program, (*1*) suggests that EPA plans to provide money to private firms for cleaning up their hazardous waste sites. The relevant recommendation from that study calls for EPA to work aggressively to seek to have private parties provide their own funds for site cleanups. This "enforcement first" policy will help ensure that limited federal funds are stretched as far as possible in cleaning up sites. To help attain more private party cleanups through enforcement actions, increased EPA staffing levels have been approved.

Finally, with reference to the editorial's discussion of the role of the Department of Energy (DOE) in the nation's hazardous waste cleanup program, EPA recognizes the significant proportion of the problem that must be addressed by DOE. Given the massive task ahead, EPA is encouraged by DOE's greatly increased attention to this area under Secretary James D. Watkins. However, the editorial seems to suggest that DOE is in a better position to address the national problem of hazardous waste sites than is EPA; we do not believe that to be the case. Our track record in recent years shows significant progress in addressing the hazardous waste problems at NPL sites. We intend to continue this momentum until the task of cleaning up Superfund sites is completed. We will continue to emphasize aggressive enforcement, control acute threats immediately, address the worst sites first, and carefully monitor and maintain sites over the long term as we carry out our mandate to protect human health and the environment.

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REFERENCES

1. W. K. Reilly, "A management review of the Superfund program" (Environmental Protection Agency, Washington, DC, 1989).

Low-Dose Radiation Exposure

We wish to clarify what may have been a widespread misunderstanding about severe mental retardation as an effect of low-dose ionizing radiation. The National Research Council issued a press release and held a press conference at the time it published the report of its Committee on the Biological Effects of Ionizing Radiation (BEIR V). On the basis of the press release, newspapers and telecasts informed the public that low-dose radiation exposure at 8 to 15 weeks of gestational age can cause mental retardation. Actually, the committee's statistical analysis of a linear model pertaining to severe mental retardation suggested "that a threshold may exist at 0.2–0.4 Gy [gray] (20–40 rad)" (*1*). The accompanying graph in the report showed little, if any, increase in retardation among persons who received less than 0.50 to 0.99 Gy (50 to 99 rad) as compared with controls.

The press release, under the heading "Mental retardation effects" was concerned, not with mental retardation as it is usually understood, but with reduction of IQ test scores and with the school performance of children in the first grade who had been exposed in utero to the atomic bomb in Japan. The estimated IQ loss was 21 to 29 points per gray, or 0.2 to 0.3 IQ points per rad. Rarely does a fetus receive more than 1 rad from diagnostic examination of the mothers abdomen during pregnancy (*2*).

The news reports contributed to an unjustified fear of essential radiological studies during pregnancy. No measurable impairment of brain function is to be expected from prenatal exposure to doses as low as those received from diagnostic x-rays.

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REFERENCES

1. Committee on the Biological Effects of Ionizing Radiations, *Health Effects of Exposure to Low Levels of Ionizing Radiation* (National Academy Press, Washington, DC, 1990), pp. 355–359.
2. *Exposure of the U.S. Population from Diagnostic Medical Radiation*, (National Council on Radiation Protection and Measurements, Bethesda, MD, 1989), report 100, fig. 3.1; J. G. Kereiakes and M. Rosenstein, *Handbook of Radiation Doses in Nuclear Medicine and Diagnostic X-Ray*, (CRC Press, Boca Raton, FL, 1980), table 102.

Eliot Marshall's article "Academy panel raises radiation risk estimates" (News & Comment, 5 Jan. p. 22) contains misstatements about me and about BEIR III. Since I take the view that radiation risks at doses of less than 0.1 gray (10 rads) are unknown, I have never declared or considered them to be "negligible." The number of dissidents in the BEIR III committee was larger than six, although it was never clear how many there were. I do not remember who first proposed a lower dose limit for risk estimates, but it was not I. I do remember that the committee was unanimous on that matter.

My position remains as valid now as it was then. Lowered dose estimates, a higher sensitivity of the young, and the (apparently appropriate) adoption of the relative risk model increase the estimates of radiation cancer risk in Hiroshima and Nagasaki. It is nevertheless unlikely that we will ever be able to evaluate the effects of low doses of ionizing radiation on the basis of epidemiology. The most persuasive aspect of extrapolations is that statistical limitations as well as other uncertainties make it impossible to discern the effects of doses that are less than about 0.1 Gy. In animals exposed to moderate radiation doses, cancer incidences that are both higher and lower than those in the control population have been demonstrated with high probability. The latter phenomenon, sometimes termed "hormesis," has caused an increasing number of people to speculate that low radiation doses may pose a risk that is less than negligible. At present this position is neither more nor less unreliable than the claim of a proportional relation for doses below 0.1 Gy.

The postulate that this relation applies to cancers in humans (except for leukemia, where incidence is high and statistical uncertainty therefore lower) is merely an article of faith. In the absence of tangible information it may be adopted in stipulating "risks" in connection with radiation protection (*1*), but any claim that these risks are actual rather than nominal cannot be supported by science but only by "political science."

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REFERENCES

1. H. H. Rossi, "Limitation and assessment in radiation protection" (Lauriston S. Taylor Lecture No. 8, National Council on Radiation Protection and Measurements, Bethesda, MD, 1984).

Boston University/Chelsea Project

Bernard J. Fine's letter of 24 November 1989 (p. 984) concerning the unprecedented Boston University–Chelsea Public Schools collaboration is inaccurate and misleading. Fine does not discuss the events that led to the overwhelming passage of the project by the Massachusetts Legislature and the signing of the legislation by Governor Michael Dukakis on 13 June 1989. He also does not discuss what took place in Chelsea between the time of that signing and the writing of his letter.

Fine suggests that Boston University is raising funds to finance "costly innovations including capital improvements," and he goes on to state that little consideration has been given to what will happen when the university withdraws. In fact, Boston University and various Chelsea groups have closely examined the state funding mechanisms for school buildings and are holding extended public discussions of how the university can indeed provide needed resources to a public school system that has suffered a severe budget drought for many years. For example, the university is in the process of installing $600,000 worth of computer hardware and software in Chelsea's classrooms at minimal future maintenance cost to the Chelsea taxpayers.

Fine states that Boston University "has insisted on not being publicly accountable." Actually, the public meetings and other university activities in Chelsea have been lauded by citizens through letters to the local newspapers, letters, and calls to Chelsea's public officials and to the university, and by several strong comments made to the Governor's Oversight Panel at its meetings. Happily, some of the strongest letters and comments have been made by citizens who did not originally support the collaboration.

Fine is, of course, right to say that "Chelsea's problems go much deeper than its school system." Because all of us involved in the collaboration knew this long ago, Boston University built into its plan the need to work effectively with Chelsea's mayor and city officials as well as with the social service agencies, the health clinics, the churches, and other citizen's groups on community problems that bear on the quality of life generally and on education specifically. Boston University has followed through on its plans: examples include the new city-wide medical plan, the award-winning intergenerational literacy project (one of 52 chosen from 1300 proposals from around the nation), and cooperation with the mayor of Chelsea in response to his request for university assistance with the operations involving Chelsea's city finances.

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Milk Products: Surplus or Shortage?

The statement in the article concerning bovine somatotropin by Marjorie Sun (News & Comment, 17 Nov., p. 876) that the United States is "awash in surplus milk" needs clarification. While milk fat (butter) continues to be in surplus, the nation is currently experiencing a shortage of milk for fluid consumption and for incorporation into dairy products. There have been, in fact, only brief periods during the last year and a half when a surplus of milk has existed, except for cream and butter. As a result of the current milk shortage, the so-called Minnesota-Wisconsin price (to which most milk prices in the United States are pegged) for milk that is used for manufacturing dairy products (cheese, non-fat dry milk powder, and butter) has increased 24.7% from $11.12 per 100 pounds in May 1989 to $13.87 in October 1989. Most milk processors managed to hold increases in fluid milk prices to a minimum until recently, but a substantial increase in the supermarket price for milk has occurred in most areas since September 1989. There is also a strong international demand for dairy products, especially for non-fat dry milk, as a result of the depletion of the supply of subsidized dairy products from the European Community.

While most dairy industry economists think that the current milk deficit is a short-term phenomenon resulting from drought and low profit margins and that supply will catch up with demand within 6 to 12 months, it also may be argued that the success of Jeremy Rifkin and other genetic engineering critics in delaying the approval of bovine somatotropin, thus denying the dairy industry a tool with which to respond quickly to an unusual situation, is at least partly responsible for this shortfall and for the resulting increased price of fluid milk and cheese to the consumer.

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Erratum: In the report "Vaccination against experimental allergic encephalomyelitis with T cell receptor peptides" by Mark D. Howell *et al.* (3 Nov., p. 668), the sequences of the peptides r-VDJ2_8 and r-VDJ2_9 shown in table 1 on page 669 were incorrect. These peptides are truncations of the r-VDJ1 sequence, not the r-VDJ2 sequence, as stated throughout the text. The actual sequences of the peptides designated r-VDJ2_8 and r-VDJ2_9 are SSDSSNTE and ASSDSSNTE, respectively.

Erratum: In the News & Comment article "Making transgenic mice: Is it really that easy?" by Marcia Barinaga (11 Aug., p. 590), the reference on page 591 to a paper published in the April 1989 issue of *Cell Biology International Reports* should have noted that the author was Franco Arezzo, not "a group at the University of Palermo."

Erratum: The caption for the figure entitled "More mad cows" accompanying Jeremy Cherfas' News & Comment article "Virus-like agent blamed for mad cow disease" (2 Feb., p. 523) was incorrect. The bar graph shown represented the cumulative number of cases of bovine spongiform encephalopathy reported in the United Kingdom from December 1988 through January 1990.

Erratum: The cover caption for the issue of 9 February 1990 should have described the molecule on the cover as VPI-5 (Dow and Virginia Polytechnic Institute), not as ALPO-5 (Union Carbide). The first sentence of the caption should have read, "Superlattices of *p*-nitroaniline molecules self-assemble and orient within the polar, greater than 10 angstrom wide channels of VIP-5, a molecular sieve." The preferred orientation of the polar molecules occurs in both materials.