

Wilson heads study on accidents at light-water reactors

At the request of the Nuclear Regulatory Commission, The American Physical Society is conducting an independent review of the NRC-supported work on radionuclide releases from severe accidents at light-water nuclear reactors. A study group has been established to investigate the problem, with Richard Wilson (Harvard University) as the chairman. Other members of the study group are David Boulware (University of Washington), Thomas Tombrello (Caltech), I. Spiewak (Institute of Energy Analysis), Allen Sessoms (US Department of State, Office of Nuclear Technology and Safeguards), Clark Ice (Dupont, retired), Peter Auer (Cornell University), Mary Shoaf (Princeton University), Leon Lidofsky (Columbia University), F. Findlayson (Aerospace Corp), Kamal Araj (Harvard University), Simon Goran (University of California, Berkeley) and Augustine Allen (Brookhaven, retired).

The study includes a critical review of experimental and theoretical work that has been completed on this question already, with the support of NRC, including analyses that have been performed for specific reactors; an evaluation of the extent to which more accurate estimates of radionuclide releases are now possible; an identification of areas in which the scientific basis for such an estimation is now inadequate, and an indication of the degree to which currently planned or additional research efforts can be expected to rectify these inadequacies.

During the last several years, substantial efforts have been devoted both abroad and in the United States toward achieving a more realistic estimation of the radionuclide releases from severe light-water reactor accidents than was possible a decade or so ago, when estimates of the probability and consequences of accidents at nuclear power plants began in earnest. These recent results suggest the possibility that the fraction of the core's inventory of some important radionuclides that is actually released for certain accident types may be significantly less than the values used in the earlier work. Because of the central role that these release fractions play in predicting the consequences of specific accidents or in estimating the overall risk due to accidents at nuclear power plants, the group expects to examine critically the



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current methods of estimating radionuclide releases due to accidents involving severe damage to the core.

The study group is examining modeling data for each step by which fission products move from their ordinary sites in the fuel material to the exterior of the containment. These steps include release from the fuel and fuel rod, transport and behavior in the reactor vessel, movement through and out of the primary system, transport and removal processes in the containment, and finally transport through the containment. The various physical and chemical processes affecting radionuclide behavior throughout this sequence are being examined carefully, because they determine the fractions of the various fission product inventories that are released from containment.

The study's central effort is to examine critically the experimental and theoretical work on radionuclide behavior under severe accident conditions. This examination is being used as a basis for evaluating the possibility of obtaining more accurate estimates of radionuclide releases than were given in the 1975 WASH-1400 report of NRC or than those now being used for safety design or regulation. As part of this critical examination, the participants expect to identify areas where the current state of knowledge is inadequate for describing radionuclide transport or estimating releases. Currently

planned safety research is being examined in order to determine its suitability for meeting these needs. Where appropriate, the participants expect to suggest additional or alternative research efforts. The group is considering present risk-assessment methodologies and the present regulatory structure as the context in which radionuclide release estimates are to be utilized. However, it is not devoting its efforts to overall risk assessments *per se* or to a detailed consideration of the implications of revised release estimates for regulatory purposes. Nevertheless, it is recognized that actual releases in accident conditions would depend substantially on specific design features. Thus the study group is considering not only basic physical phenomena on a generic basis, but also the importance of the role played by design variability from one reactor to another.

The group started its work in September 1983 and has met three times so far. Its goal is to have a draft report prepared by early in 1985.

CSWP compiles directory of colloquium speakers

To increase the exposure of women scientists and to help provide female role models for physics students, the APS Committee on the Status of Women in Physics has compiled a directory, "Physics Colloquium Speakers and Titles." The directory lists many prominent women physicists along with sample titles of talks they might present. The first such directory, prepared last year, listed 21 active researchers. It was distributed to all US institutions that grant physics PhDs and was an immediate success. Numerous invitations ensued, and the resulting colloquia were very well received, stimulating CSWP to continue the project. This year 36 women scientists have agreed to participate. Their researches cover a wide range of fields including nuclear, high-energy, condensed-matter, solar physics and biophysics. Anyone interested in receiving a copy of the 1983-84 directory, or in being included in next year's program, should contact Barbara Wilson, Bell Laboratories, Room 1D-465, 600 Mountain Avenue, Murray Hill, NJ 07974. □