

N219. Worker Exposures Plunge At U.S. Nuclear Plants

In 1991, the average collective exposure of the workforce per plant fell to 253 person-rem in the USA, down 24% from 333 person-rem in 1990, according to the Nuclear Regulatory Commission. The last time collective exposures per U.S. nuclear plant were this low was in 1969, when only seven light-water reactors were on line, the NRC said.

Reliability Reduces Exposure

The Commission attributed the decline to the increased reliability of U.S. nuclear plants and the move toward longer fuel cycles, which meant fewer maintenance and refueling outages. In 1991, U.S. nuclear plants operated at nearly 70% average load factor and an increasing number of U.S. nuclear units are moving toward fuel cycles of 18 months or longer.

NRC data support the conclusion that declining exposures are linked to improved operating records. At the 11 worst U.S. plants in terms of worker exposures, the NRC data show that 87% of the dose came about during plant outages. Activities that most frequently contributed to such exposures were valve maintenance and repair, in-service inspection work, control rod drive replacement and repair, installation and removal of scaffolding, and insulation and refueling activities, the NRC said.

Both BWRs and PWRs showed a large drop in worker exposures. For PWRs, the average collective radiation dose per unit was 223 person-rem in 1991, 22% below the 1990 level of 285 person-rem, the NRC said. For BWRs, the average was 314 person-rem, a 26% drop from the previous year's average of 426 person-rem.

The NRC data also show that the average dose received by an individual worker declined too. The average nuclear plant worker in the U.S. was exposed to 290 millirems in 1991. This was down from 340 millirems the year before, and it was less radiation than the average U.S. nuclear plant worker was exposed to in 1983. The numbers reflect what the workers are exposed to on the job. It is in addition to the radiation they receive -- as everyone does -- as a result of natural background radiation, medical treatments, and ordinary, everyday activities such as watching TV. The average member of the U.S. public receives 360 millirems every year, mostly as a result of exposure to natural background radiation and radon gas.

Of the U.S. nuclear plant workers monitored for radiation in 1991, the majority had no exposure at all, the NRC data show. Of those that had some exposure, about half received less than ten millirems and more than nine out of ten received less than one rem (1000 millirems). Only one U.S. worker was exposed to more than four rem, and none to more than five rem, the NRC data show.

Taken from "Worker Exposures Plunge at U.S. Nuclear Plants," Nuclear Engineering International, April 1993, p. 34.

EDITORS' NOTE: Since the above article was abstracted, 1992 data was received from the Institute of Nuclear Power Operations (INPO). There was a slight increase in annual collective radiation exposures for both PWR and BWR type plants. According to INPO, the PWR mean collective dose increased from 189 person-rem per unit in 1991 to 193 person-rem per unit in 1992. The BWR mean collective dose rose from 293 person-rem per unit to 368 person-rem per unit. The 1995 goal set by INPO for the two types of reactors are 185 and 255 person-rem per unit.