

Relationship between the Value of a Person-Rem Averted and Offsite Property Damage

The dollar per person-rem averted is the monetized value of a person-rem used in regulatory and backfit analysis. When proposed regulatory actions are analyzed, the value of a person-rem averted is used as an economic measure of the amount of radiation that could potentially be reduced by the proposed action.

The NRC and its predecessor agency, the Atomic Energy Commission, used a conversion factor originally developed in the 1970's of \$1000 per person-rem as the monetary valuation of the consequences associated with radiological exposure. Subsequently, in the 1980s the NRC undertook an evaluation of the use of \$1000 per person-rem value and subsequently defined it as a surrogate for all averted offsite losses, health as well as property. Further, at that time the value was not discounted over time such that a person-rem averted was worth the same dollar amount whether it was averted next year, in 10 years, or in 100 years.

In the 1980s, the NRC issued and then amended 10 CFR 50.109, its reactor backfitting regulation, and in 1990, issued NUREG-1409, "Backfitting Guidelines." At that time, the \$1000 per person-rem value incorporated all offsite property costs and neither the backfit rule nor the implementing guidelines provide any detail about considering offsite property in relation to a backfit analysis for a cost-justified substantial safety enhancement.

In 1995, the NRC revisited the \$1000 per person-rem value and issued NUREG-1530, "Reassessment of NRC's Dollar per Person-Rem Conversion Factor Policy."¹ The document revised the value to \$2000 per person-rem and limited it to health effects. Therefore, offsite property damage costs were no longer included within the \$2000 per person-rem value. Separate estimates of the offsite costs are now necessary in order to account for impacts beyond human health concerns.

Two guidance documents discuss the treatment of offsite costs. The first, "Regulatory Analysis Guidelines of the U.S. Nuclear Regulatory Commission," NUREG/BR-0058, Revision 4, 2004, describes attributes to be considered when performing a regulatory analysis including "averted offsite property damage." The second, "Regulatory Analysis Technical Evaluation Handbook," NUREG/BR-0184, 1997, provides additional detailed guidance for the analysis.² NUREG/BR-0184 indicates that, in the case of nuclear power plants, changes in public health and safety from radiation exposure and offsite property impacts should be examined over a 50-mile distance from the plant site, which is beyond the 10-mile Emergency Planning Zone.

Although these guidance documents have been created to determine the affects of offsite property damage outside the dollar per person-rem, NUREG-1409 has not been updated to take into account the separation of offsite property damage from the dollar per person-rem value.

¹ The Office of Nuclear Reactor Regulation recently requested that the Office of Nuclear Regulatory Research reassess and update the dollar per-person rem conversion factor policy. Please see Enclosure 8 for more details.

² NUREG-0184 attempts to account for the total monetary effects on offsite property including direct effects and indirect effects like tourism. The total monetary effects are normally calculated as the product of the change in accident frequency and the property consequences resulting from the occurrence of an accident (e.g., costs of interdiction measures such as decontamination, cleanup, and evacuation).