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Society for Risk Analysis

Study Results Support Nuclear Waste Disposal at Western New York Site

Study Provides Tools to Better Predict, Assess, and Manage Disposal Decisions

Washington, D.C. – Engineering and scientific experts associated with U.S. and New York state energy agencies announced they have developed an improved method of predicting scenarios where people might be exposed to radiation from nuclear waste disposal sites. The study was funded by the New York State Energy Research and Development Agency and focuses on a buried nuclear waste disposal facility at West Valley, New York. The scientific analysis supports a decision to continue management of waste at the site for another decade.

Researchers say their approach represents a first-of-its-kind method of analysis that considers the full scope of possible scenarios, likelihoods, and consequences that might be a threat to the disposal site. Using this approach, the authors concluded, "that a release resulting in a dose of 100 millirems in one year, or more, is extremely unlikely during the next 30 years of operation of the New York State managed disposal area at the Western New York Nuclear Service Center." By comparison, the public is exposed to approximately 300 millirems a year of cosmic radiation in the atmosphere with no visible health effects. Five basic release mechanisms were considered involving hypothetical releases of radionuclides by liquid, solid, or air pathways.

The study was designed to answer the three basic risk questions: "What risk scenarios can occur?" "What is the likelihood of each scenario?" and "What are the consequences of the scenarios individually and collectively?" By analyzing and assigning probabilities to these questions, the team was able to make sophisticated safety determinations that considered high probability and low consequence events, as well as low probability and high consequence events.

According to lead researcher Dr. B. John Garrick, "a general theory of quantitative risk assessment is emerging that is applicable to any kind of risk." The approach -- while focused in this case on safety decisions of where and how to dispose of nuclear materials at hazardous waste facilities -- "has broader applications to other types of risk scenarios and outcomes," according to Dr. Garrick.

This new application of quantitative risk assessment is detailed in the article "Quantitative Risk Assessment of the New York State Operated West Valley Radioactive Waste Disposal Area" in the August issue of the journal Risk Analysis, published by the Society for Risk Analysis. In

addition to Garrick, who is a pioneer in the risk sciences and the current Chairman of the U.S. Nuclear Waste Technical Review Board, authors include John W. Stetkar, an independent consultant and member of the U.S. Nuclear Regulatory Commission's Committee on Reactor Safeguards, and Paul J. Bembia, Program Director, West Valley Site Management Program, New York State Energy Research and Development Authority.

The researchers say their approach is unique for this application in that it integrates four key criteria in its analysis, including: 1) the frequency of disruptive events and natural processes that cause a release of radioactive materials from the disposal area; 2) the type and amount of radioactive material that might be released during each scenario; 3) the movement, composition and potential dilution of radioactive contaminants in the environment; and 4) the potential for public exposure to radioactive materials and the possible dose of that exposure. In addition, the analysis ranks the importance of each contributing scenario, which facilitates taking corrective actions, implementing effective risk management, and perhaps more importantly, quantifies the uncertainties associated with the various factors.

The team acknowledges that the largest uncertainties surround the frequency of very large releases. "It's important to understand that the key uncertainties are driven by such phenomenon as extreme rainfall, severe storms, runoff, flooding and earthquakes and other phenomena in the subsurface and on the surface, "according to Garrick.

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