

Environmental Sciences Division

**Principles and Issues in Radio-Ecological Risk Assessment (Radio-ERA)**

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I do not wish to be judged for the Best Student Paper Award

**Principles and Issues in Radio-Ecological Risk Assessment (Radio-ERA).** Jones, D.S.\*, Oak Ridge National Laboratory\*\*, Oak Ridge, TN.; Bilyard, G. R., Pacific Northwest National Laboratory, Richland, WA.; Domotor, S. L., U.S. Department of Energy, Washington, DC.; Higley, K. A., Oregon State University, Corvallis, OR.; Kocher, D.C., Oak Ridge National Laboratory, Oak Ridge, TN. It is no longer acceptable to claim that ecological receptors are protected from adverse effects of environmental radiation if people are protected, unless protection is demonstrated. Therefore, the U.S. Department of Energy and other national and international agencies are beginning to address radiation dose limits for non-human biota in earnest. Ecological risk assessment (ERA) principles can be used to demonstrate protection of the environment from anthropogenic sources of radiation. This presentation introduces the issues unique to Radio-Ecological Risk Assessment (Radio-ERA). Our intention is to bridge the gap between Radio-ERA and chemical ERA, and to provide a technical frame-of-reference for more detailed discussion. Issues addressed include: relevant characteristics of the major types of ionizing radiation; external exposure in the absence of biological uptake of the measured contaminants (i.e., radionuclides), additivity of internal and external exposures from all radionuclides, providing relative biological effectiveness (weighting) has been accounted for; radiation decay products; and differences in radiosensitivity among major taxa. Comparisons is drawn to ERA for chemicals whenever possible. For example, radiation weighting for biological effectiveness is conceptually similar to using toxic equivalents (TEQs) for dioxin. In summary, Radio-ERA can address the unique issues associated with environmental radiation in a manner that is readily understood by those familiar with traditional ERA. \*\* Managed by UT-Battelle, LLC, for the U.S. Dept. of Energy under contract DE-AC05-00OR22725.