

Session 2: Workshop 2: Dose Assessment: What is in the Black Box Known as Emergency Dose Assessment?

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Abstract:

A fundamental need in a radiological emergency is an ability to assess the magnitude and downwind consequences of the very physical characteristic that makes a radiological emergency response plan necessary—radioactivity—and its consequence, radiation dose. When a release of radioactive materials occurs during an accident, where that release is headed (and where it has been) and the magnitude of the potential radiation dose to the public as a result, are significant inputs to the critical decisions regarding protective actions for persons on the plant site and for members of the public beyond the site boundary. When a release of radioactive materials is already in progress, field monitoring teams can directly measure the resulting radiation doses in the environment. However, since protective measures are most effective when implemented before the release begins, there remains a need for assessing what the consequences of a release could be before the release starts.

Dose assessment can appear as black box—you put in source term data, meteorology data, dose factors, and out comes the projected dose. In this training workshop, we will pry open that black box and have a look at the methods, principles, and assumptions that are inside. After a brief discussion of the role of dose assessments in emergency response, we will divide the dose assessment process into its three major components: (1) assessing the magnitude and composition of the radioactive material available to be released, and the rate of that release; (2) assessing how the released material is dispersed and transported from the release point to the downwind receptors; and (3) assessing the radiation exposure to the receptors from that material. Our objective in this program is not to be able to write our own dose assessment software, but rather to gain an understanding of the capabilities, limitations and uncertainties of dose assessments in general—to be a better consumer of the data our dose assessors prepare. This training workshop will not focus on a particular dose assessment package, but rather, the methods incorporated in typical dose assessment packages.

Biographical Sketch of Stephen F. LaVie:

Steve LaVie, a Senior EP Specialist in NRC's Office of Nuclear Security and Incident Response (NSIR), develops EP policies, regulations, and guidance for nuclear reactors; reviews licensing actions; and supports regional EP inspection activities. Prior to joining NSIR, he worked in the Office of Nuclear Reactor Regulation developing methods and guidance for, and performing, radiological consequence evaluations of postulated reactor accidents. Major projects included rulemaking on source terms and performing reviews of tritium production cores, mixed oxide fuel test assemblies, and a new submarine reactor design. Steve serves as a Radiological Assessment Assistant Director of the Protective Measures Team in the NRC's Incident Response Center. Prior to joining the NRC in 1997, Steve served 15 years at the Beaver Valley Power Station working on radiological consequence analyses. He served as the system manager of the site's meteorological measurements and accident dose assessment capability and supported the site's EP program by developing emergency action levels (EALs), protective action guidance, and dose assessment procedures. He served as a dose projection coordinator in the emergency response organization. As a member of the ANS-3.8 Working Group, he worked on the development of standards on field monitoring (ANS 3.8.5) and radiological assessment (ANS 3.8.6). At NUS Corporation, he provided health physics and EP support to client utilities.