

ASPR TRACIE Technical Assistance Request

Requestor: [REDACTED]
Requestor Phone: [REDACTED]
Requestor Email:
Request Receipt Date (by ASPR TRACIE): 10 February 2016
Response Date: 19 February 2016
Type of TA Request: Standard

Request:

[REDACTED] reviewed ASPR TRACIE's Radiological and Nuclear Topic Collection and noted that the resources provided were mostly focused on very significant or catastrophic releases. He is interested in low level releases/ exposure, which is what he encounters most often and what their local health officials have difficulty comprehending and overlook in their planning and training. He asked ASPR TRACIE if we had any resources specifically related to low level releases/ exposure.

Response:

The ASPR TRACIE team conducted a search and reached out to several of our ASPR TRACIE SME Cadre members with expertise in the field to gather the resources below. The first section below includes several evaluations and studies. The second section provides guidance documents and additional general information related to low level releases/ exposure. Finally, the third section includes a few websites that may be helpful.

I. Evaluation and Studies

Abbott, A. (2015). [Researchers Pin down Risks of Low-Dose Radiation](#). Nature. Volume 523, Issue 7558.

The author of this article discusses how long-term exposure to low-dose radiation can increase the risk of leukemia.

Bible, J., Emery, R.J., Williams, T., and Wang, S. (2006). [A Security Vulnerabilities Assessment Tool for Interim Storage Facilities of Low-Level Radioactive Waste](#). (Abstract only.) Health Physics. 91(5) Suppl2:S66-73.

This article describes a tool that can be used to assess security risk for any site that provides storage of low-level radioactive waste. It was designed to be used by radiation safety professionals who are not security trained.

BMJ. (2015). [Study Provides More Precise Estimates of Cancer Risks Associated with Low Level Radiation: Results Strengthen Foundation for Current Radiation Protection Standards](#). ScienceDaily. 20.

This article provides a summary of a study conducted to correlate the risks of cancer associated with exposure to low level radiation. The study involved 308,297 nuclear industry workers from France, the United Kingdom, and the United States. Results indicated evidence of a linear increase in the excess relative rate of cancer mortality with increasing exposure to ionising radiation at the low dose rates typically encountered in the nuclear industries.

Cohen, B.L. (2002). [Cancer Risk from Low-Level Radiation](#). American Journal of Roentgenology. Volume 179, Number 5.

The author of this article explains how much work and substantial monetary expenditures have been devoted to reducing radiation exposure from radiography and other medical procedures. However, he notes the sentiment has shifted to regard the risk estimates in the low dose region that are based on the linear no threshold theory as being grossly exaggerated or completely negligible. The purpose of this article is to review the basis for the linear no-threshold theory and to present some of the emerging information that has caused this shift in sentiment.

Emery, R.J. (2012). [How the University of Texas System Responded to the Need for Interim Storage of Low-Level Radioactive Storage Materials](#). (Abstract only.) Health Physics. 103(5 Suppl 3): 194-198.

An interim storage facility was developed for low-level radioactive waste and can serve as a model for a collective surge capacity storage site during a natural disaster or emergency.

Royal, H.D. (2008). [Effects of Low Level Radiation-What's New?](#) (Abstract only.) Seminars in Nuclear Medicine. 38(5):392-402.

The author of this article discusses the BEIR (Biological Effects of Ionizing Radiation) reports, which are a series of publications by the National Academy of Sciences. BEIR VII reconfirmed that the linear no threshold model is the most practical model to estimate radiation risks, especially for radiation protection purposes. The purpose of this article is to highlight the contents of this important publication with particular emphasis on what is emerging.

Wing, S. (n.d.). [Low-level Ionizing Radiation and Human Health: An Evaluation of Impacts of Proposed Deregulation of Radioactive Wastes](#). University of North Carolina, Department of Epidemiology, School of Public Health.

The author of this article describes the health effects of low-level ionizing radiation, including cancer, heritable mutations, and other significant health effects

II. Guidance Documents and Additional General Resources

American Association of Physicists in Medicine by the American Institute of Physics. (1986). [A Primer on Low-Level Ionizing Radiation and Its Biological Effects.](#)

This primer is intended to provide a review of the scientific background and potential risk estimates of adverse effects of low level radiation exposure. Although it is outdated, this resource may still be helpful.

Nuclear Energy Institute. (2015). [Radiation Standards and Organizations Provide Safety for Public and Workers: Fact Sheets.](#)

This resources provides general information on radiation, including where radiation comes from, who sets radiation standards, and sources of data used to set radiation standards.

Nuclear Information and Resource Service. (1992). [“Low Level” Radioactive Waste.](#)

This link lists sources for low level radioactive waste by type, volume, curies, half-life, decay time to be considered hazardous, and states’ authorities to protect the public.

Occupational Safety and Health Administration. (2005). [Occupational Exposure to Ionizing Radiation.](#)

This document is a request for information from the Occupational Safety and Health Administration asking for information on issues related to the increasing use of ionizing radiation in the workplace and potential worker exposure to it.

United States Nuclear Regulatory Commission. (2015). [Backgrounder on Biological Effects of Radiation.](#)

This brief document provides background on radiation and information on the biological effects it can have on individuals.

U.S. Nuclear Regulatory Commission. (2002). [Radioactive Waste: Production, Storage, Disposal.](#)

This document defines both high-level and low-level radioactive waste. It includes origins of low-level waste (0.1% nationally from medical facilities), on-site storage of low-level waste at medical sites, methods of monitoring decay to safe levels, and state regulations to support safe disposal.

U.S. Nuclear Regulatory Commission. (2015). [Radioactive Waste: Production, Storage, Disposal \(NUREG/BR-0216, Revision 2\)](#).

An introductory description is given about types of radioactive waste and defines the role of the U.S. Department of Energy and the Nuclear Regulatory Commission for waste management, storage and disposal. It refers to agreements with 32 states.

World Nuclear Association. (2012). [Radiation and Life](#).

This resource provides information on radiation such as, unstable atoms, atomic decay, half-life types, ionizing radiation, measuring ionizing radiation, and the health risks from ionizing radiation.

World Nuclear Association. (2015). [Nuclear Radiation and Health Effects](#).

This resource provides an overview of nuclear radiation, including the types of radiation, units of radiation and radioactivity, effects of ionizing radiation, limiting exposure, standards and regulation of radiation exposure, nuclear fuel cycle radiation exposures, and accidental radiation exposure (nuclear and other).

III. Websites

U.S. Department of Health and Human Services. [Radiation Emergency Medical Management: Hospital Activities](#).

U.S. Nuclear Regulatory Commission. [Frequently Asked Questions \(FAQ\) About Radiation Protection](#).

U.S. Nuclear Regulatory Commission. [Low Level Waste](#).