

Introduction to the Trinity Nuclear Test Collection of Papers

THIS SPECIAL collection of papers in *Health Physics* focuses on assessments of the environmental contamination, radiation doses, and health risks from the Trinity nuclear test. Trinity was the first detonation of a nuclear device in the history of the world and took place on 16 July 1945 in south-central New Mexico, three weeks before the bombing of Hiroshima and Nagasaki at the end of WW II.

The test was kept secret, in particular, from the residents of New Mexico, who received no advanced warning. It was not until 1987 that a detailed assessment of the Trinity fallout plume was published in the scientific peer-reviewed literature. That analysis indicated a northeast-moving plume with little to no contamination south of the detonation site.

In the 1980s, there were extensive assessments conducted for Nevada nuclear testing, prompted by the 10-y lawsuit of *Allen et al. vs. the United States*. To date, however, there has not been an assessment of public exposures and health risks from Trinity.

Residents of New Mexico have voiced for many years their concern about lingering effects from the Trinity test. In 2007, Congress requested the National Cancer Institute (NCI) to provide expert guidance on exposures and risks from Trinity. The charge was given to an internal research group at the NCI who were studying health risks from radioactive fallout from nuclear testing in Nevada, Marshall Islands, Kazakhstan, and elsewhere. Members of that group were also deeply involved in the study of radiation risk following the Chernobyl accident and on quantifying risk from medical radiation, which is widely used in the U.S. and worldwide. While the NCI issued a brief report on Trinity to Congress in 2007, there were remaining issues that necessitated further detailed investigation.

During the last 6 y, researchers at the National Cancer Institute undertook a risk projection study to address the questions of interest for Trinity more fully. They received input from regional stakeholders and experts in New Mexico and derived five major questions of concern, all which have been addressed in this collection of publications. These questions are:

- What models and relevant input data are available to estimate the doses to New Mexico residents?
- What are the estimated magnitudes of organ doses received by location, age, and ethnicity in New Mexico from the Trinity detonation?
- How many cancers are projected above baseline to have occurred in population groups specified by location, age, and ethnicity as a result of exposures to Trinity fallout?
- What evidence exists for a multi-generational cancer risk among New Mexico residents from exposures to Trinity, and how large might that effect be?
- As it is well known that Trinity was relatively inefficient in the fission of its plutonium fuel, can the unfissioned plutonium be accounted for? Where is the unfissioned plutonium, and what are the health implications of that contamination?

The authors of this collection of papers sincerely hope that the information provided herein is found to be useful for those interested in the health and environmental implications of the Trinity nuclear test.

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The author declares no conflicts of interest.

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