

Nuclear Test Personnel Review (NTPR) Program: Program Reviews and Scientific Studies (Toll Free Hot Line: (800) 462-3683)

The Defense Threat Reduction Agency (DTRA) is the Department of Defense (DoD) Executive Agent for the Nuclear Test Personnel Review (NTPR) Program, which serves veterans who participated in U.S. atmospheric nuclear tests, served with the American occupation forces of Hiroshima and Nagasaki, Japan, or were prisoners of war in Japan at the conclusion of World War II. The primary purpose of the NTPR Program is to provide participation data and radiation dose information to veterans. Since its inception in 1978, the NTPR Program has identified approximately 230,000 DoD personnel who participated in U.S. atmospheric nuclear tests conducted primarily in Nevada and the Pacific Ocean between 1945 and 1962. Since 1988, the program has added approximately 230,000 DoD personnel who participated in the post-World War II occupation of Hiroshima or Nagasaki, bringing the total NTPR population to over 460,000.

Program Reviews

In 1985, the NTPR dose reconstruction methodology was published Title 32, Code of Federal Regulations, Part 218 (32 CFR 218). Since that time, the scientific methods used by the NTPR Program have been reviewed several times by the Government Accountability Office (GAO, formerly the General Accounting Office) and the National Academy of Sciences (NAS).

GAO

The GAO is the investigative arm of Congress, chartered to study the programs and expenditures of the federal government in an independent and nonpartisan fashion. The GAO has been directed by Congress on four occasions to perform independent reviews of the NTPR Program:

- "Operation CROSSROADS. Personnel Radiation Exposure Estimates Should be Improved" (1985)
This review was commissioned to examine issues regarding radiation safety activities during Operation CROSSROADS, a U.S. atmospheric nuclear test series conducted at Bikini Atoll in 1946. The report concluded that some adjustments to the radiation exposure estimates calculated for test participants may be necessary because allowances were not made for film badge inaccuracies, comprehensive personnel decontamination procedures were either inadequate or not implemented, exposure estimates from ingestion or open wounds were not calculated, and inhalation estimates may have been underestimated.
- "Nuclear Health and Safety: Radiation Exposures for Some Cloud-Sampling Personnel Need to be Reexamined" (1987)
This review was commissioned to determine the number of personnel involved in nuclear cloud sampling activities at three selected operations and how much radiation exposure they may have

received. The report concluded that external exposure for some personnel was understated and required reexamination. In addition, protective breathing devices were not consistently used by ground personnel working around contaminated aircraft, necessitating reevaluation of their internal radiation exposures.

- "Nuclear Health and Safety: Mortality Study of Atmospheric Nuclear Test Participants is Flawed" (1992)

This review was commissioned to determine the accuracy of the participation and radiation exposure data supplied to the NAS for its 1985 report entitled "Mortality of Nuclear Weapons Test Participants." The report concluded that the magnitude of the inaccuracies in the data used by the NAS raised serious questions about the study's findings, and that the study should be repeated.

- "Veteran's Benefits: Independent Review Could Improve Credibility of Radiation Exposure Estimates" (2000)

This review was commissioned to evaluate the validity of dose reconstruction as a tool for estimating radiation exposures, to examine alternatives for deciding radiation-related claims, and to determine what oversight activities are in place. The report concluded that dose reconstruction is a valid method for estimating doses and identified no better alternatives for deciding radiation related claims. However, concerns were expressed regarding the lack of independent review, specifically quality control and peer review. Establishing an independent review process could build greater public confidence in the dose reconstruction program.

NAS

The NAS is a private, non-profit institution chartered and mandated by Congress to advise the federal government on scientific and technical matters. The National Research Council, acting as the principal operating agency of the NAS, has performed four external scientific reviews of the NTPR Program:

- "Review of the Methods Used to Assign Radiation Doses to Service Personnel at Nuclear Weapons Tests" (1985)

The purpose of this study was to evaluate whether the methods used by the NTPR Program to assign radiation doses were comprehensive and scientifically sound, but did not include audits of dose reconstructions for specific veterans. The review committee concluded that the procedures used to estimate external doses were reasonably sound, and that a bias may exist that probably tends to overestimate the most likely dose (especially for internal emitters). The committee had concerns about the methods for estimating internal doses but conceded that inhalation exposures had only a minor impact on total doses.

- "Film Badge Dosimetry in Atmospheric Nuclear Tests" (1989)

This study was an evaluation of dosimetry practices used during weapons testing, concluding that it was feasible to estimate participant radiation doses with reasonable certainty. It included methods for addressing uncertainties in dosimetry readings and the conversion of readings to organ doses.

- "A Review of the Dosimetry Data Available in the NTPR Program" (1995)

Anticipating completion of the Five Series Study in 1997, this review was necessary to verify the suitability of reconstructed doses as a basis for dose response analysis and was published as Appendix A of the Five Series Study. This review concluded that NTPR radiation dose data were not suitable for dose response analysis due to inconsistencies in dose reconstruction methods and uncertainty estimation, as well as a lack of documentation about dose assignment methods and the NTPR database.

- "A Review of the Dose Reconstruction Program of the Defense Threat Reduction Agency" (2003)

Prompted by the most recent GAO report to Congress (2000), this review included random sampling of dose reconstructions to determine:

- Whether or not the reconstruction of sample doses is accurate.
- Whether or not the reconstructed doses are accurately reported.
- Whether or not the assumptions made regarding radiation exposure based on sampled doses are credible.
- Whether or not the data from nuclear tests used as a part of the reconstruction of sampled doses are accurate.

Known as the "green book" by many veterans, the final report outlined several conclusions and recommended improvements relating to all aspects of the NTPR dose reconstruction process:

1. If the program of dose reconstruction continues, there should be ongoing external review and oversight of the dose reconstruction and compensation programs for atomic veterans. One way to implement this recommendation would be to establish an independent advisory board.
2. There should be a comprehensive reevaluation of the methods being used to estimate doses and their uncertainties to establish more credible upper bound doses to atomic veterans.
3. A comprehensive manual of standard operating procedures for the conduct of dose reconstructions should be developed and maintained.
4. A state-of-the-art program of quality assurance and quality control for dose reconstructions should be developed and implemented.
5. The principle of benefit of the doubt should be consistently applied in all dose reconstructions in accordance with applicable federal regulations.
6. Interaction and communication with the atomic veterans should be improved. For example, veterans should be allowed to review the scenario assumptions used in their dose reconstructions before the dose assessments are sent to the Department of Veterans Affairs for claim adjudication.
7. More effective approaches should be established to communicate the meaning of information on radiation risk to the veterans. In addition to presenting general information on radiation risk, information should be communicated to veterans who file claims regarding the significance of their doses in relation to their diseases.
8. The community of atomic veterans and their survivors should be notified when the methods for calculating doses have changed so that they can ask for updated dose assessments and reevaluation of their prior claims.

The NTPR Program suspended operations between May and October 2003 to review and incorporate these recommendations. Several program modifications have been implemented, and the Veterans' Advisory Board on Dose Reconstruction has been jointly chartered by DTRA and VA to provide independent oversight of the NTPR Program.

Support of Scientific Studies

One of the four primary mission elements of the NTPR Program is to support independent scientific studies to ascertain whether U.S. atmospheric nuclear test participants have experienced adverse health effects as a result of their participation. Specifically, the NTPR Program has supported scientific studies conducted by the NAS to determine whether there is an increased radiogenic disease-specific (such as leukemia, liver cancer, or thyroid cancer) mortality among U.S. atmospheric nuclear test participants. Two cohort epidemiological studies are summarized below:

- "Mortality of Veteran Participants in the CROSSROADS Nuclear Test" (1996)

Conducted in the Pacific in 1946, Operation CROSSROADS was the first peacetime atmospheric nuclear test series. This study focused on a cohort of approximately 40,000 Navy participants, finding that these participants experienced a 4.6 percent increase in mortality (deaths from all causes when compared with a comparable number of military personnel who were not participants). This finding was statistically significant at the 95 percent confidence level. When malignancies (cancer) and leukemia were considered, participant mortality was slightly elevated, but the results were not statistically significant. The increase in mortality from all causes did not concentrate in any disease group examined, and the results did not vary when participants engaging in higher exposure occupations were compared to the rest of the participants. This report concluded that exposure to radiation was not the cause of the increase in mortality from all causes among CROSSROADS participants.

- "The Five Series Study: Mortality of Military Participants in U.S. Nuclear Weapons Tests" (2000)

To overcome the limitations of a similar study completed in 1985 ("Mortality of Nuclear Weapons Test Participants"), this study focused on a cohort of approximately 68,000 military personnel who participated in at least one of five selected U.S. atmospheric test series: [Operations GREENHOUSE \(1951\)](#), [UPSHOT-KNOTHOLE \(1953\)](#), [CASTLE\(1954\)](#), [REDWING \(1956\)](#), and [PLUMBBOB \(1957\)](#). The risk of death for test participants was compared to that of a control group of approximately 65,000 comparable military personnel who were not test participants. The study concluded:

- Overall, participants and controls had basically the same risk of death from all causes;
- Overall, participants did not experience widespread early death;
- Participants and controls had basically the same risk of death from cancer;
- Participants experienced a 14 percent higher risk of death (25 excess deaths) from leukemia than controls, but the elevated result was not statistically significant;
- Statistical significance in risk of participant death was noted as follows:
 - Increased risk overall from external causes, such as motor vehicle accidents;
 - Increased risk overall from nasal cancer and prostate cancer;
 - Increased risk from leukemia in Nevada Test Site (UPSHOTKNOTHOLE and PLUMBBOB) participants;

- Increased risk of death from all causes in Pacific Ocean (GREENHOUSE, CASTLE, and REDWING) participants.

The excess cancer (leukemia, nasal, and prostate) deaths among participants amounted to less than about 100 cases, which the NAS concluded could be attributed to chance as well as participation.

Copies of in-print NAS reports and free online reading access are generally available through the National Academies Press (800-624-6242).

NTPR Inquiries

Veterans desiring service or seeking information about the NTPR Program can address their inquiries to:

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More information is available at Nuclear Test Personnel Review.

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