# Fact Sheet

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**Defense Nuclear Agency**
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Subject: Epidemiology and the Nuclear Test Personnel Review Program

A major aspect of the Nuclear Test Personnel Review (NTPR) Program has been devoted to ascertaining the health status of Department of Defense (DoD) participants in atmospheric nuclear testing. This involves the epidemiological investigation of selected participant groups. The studies were designed to identify any unusual incidence of disease. If unusual incidence of disease is found among test participants, radiation exposure from the tests would warrant investigation as a possible cause. In that event, follow-up studies would attempt to isolate the cause(s) of any anomalies. Research to date indicates that radiation doses to most DoD personnel were quite low, averaging about 0.625 rem. This is one-eighth the current Federal guidance for allowable dose to radiation workers, which permits up to 5 rem per year. Even at the currently allowable dose, there is a very low risk of induction of any type of radiogenic disease above that normally expected in the unexposed, general population.

An unusual incidence of leukemia originally prompted the NTPR Program. By 1978, eight leukemia cases had emerged (where only three or four were expected) among the approximately 3200 DoD personnel who, in 1957, were at or near the Nevada Test Site on the day of Shot SMOKY, Operation PLUMBBOB. The Centers for Disease Control (CDC) published the results of an epidemiological study of this group in the *Journal of the American Medical Association* on August 5, 1983. The conclusions were that participant deaths due to cancer, as well as total number of cases of cancer, were slightly less than the statistical norm, except for the larger-than-expected number of leukemia cases. CDC attributed this increase to chance, to factors other than radiation, or to some combination of risk factors, possibly including radiation. An additional finding was that the total number of deaths from all causes was essentially as expected from natural causes.

Concurrently, the Defense Nuclear Agency (DNA) engaged the National Academy of Sciences (NAS) to study the health status of more than 46,000 test personnel. The NAS selected participants at PLUMBBOB and four other test operations: REDWING (1956), CASTLE (1954), UPSHOT-KNOTHOLE (1953), and GREENHOUSE (1951). The Academy, an independent, Congressionally chartered organization, utilizes leading national experts in their respective fields to conduct such reviews. Jointly funded by DNA and the Department of Energy (DOE), this study, entitled "Mortality of Nuclear Weapons Test Participants," encompassed nearly one-fourth of all veterans involved in atmospheric nuclear tests. The NAS review of death certificates for this large sample of "atomic veterans" provided no consistent evidence of increased deaths from cancer or other diseases for the veterans overall. The study confirmed the excess leukemia among the SMOKY participants and found a slightly increased number of prostate cancers among personnel who participated in Operation REDWING in 1956. The NAS also found that the entire group had a lower death rate than the national average for their age group.

Moreover, the incidence of death due to disease was less than expected whereas traumatic deaths (e.g., accident, war, crime) were greater. The NAS found no evidence of excess deaths attributable to radiation exposure.

The National Academy of Sciences also convened a panel in May 1981 to investigate the incidence of multiple myeloma among the occupation forces of Hiroshima and Nagasaki. DNA and veterans groups provided the Academy with the names of all known participants who reportedly had multiple myeloma. NAS concluded that the reported incidence of nine verified cases of multiple myeloma among U.S. veterans of the occupation forces stationed at or near Hiroshima and Nagasaki is less than the incidence in the general population. The expected incidence in a group of this size would be 18.

DNA and the VA are supporting an additional NAS study, initiated in 1988. The study is examining the mortality of the some 42,000 participants at Operation CROSSROADS, as well as that of a control group of a like number of unexposed personnel serving at the same time and in similar duties. The use of a control group will ensure that the mortality of CROSSROADS participants is compared to that of personnel whose basic activities and initial level of health were similar. The study should be completed in about four years.

The VA has made it possible for personnel who served on active duty and have doses in excess of 5 rem to be provided a complete medical examination to assess their health status. About 1700 DoD personnel (less than one percent) have such doses, both recorded and calculated, and virtually all have been contacted by DNA and offered this service. Only those who could not be located after extensive efforts have not been so notified. About one-third of the participants have been given physical examinations at VA facilities. The incidence of cancer in this group has been found to be less than the national average. In addition, the VA provides medical examinations, hospital and nursing home care, and limited outpatient services for veterans with radiogenic conditions, in accordance with Public Law 97-72.

In the aggregate, the findings of health studies are consistent with what would be expected for unexposed populations. This is not surprising because of the generally low radiation doses received by test participants. National and international authorities have addressed in detail the health risks caused by radiation and have recommended dose limits for radiation workers. It has been established that adverse health effects can result from <u>high doses</u> of ionizing radiation (e.g., 100 rem or more), but it is not known whether there are deleterious health effects from <u>low doses</u> of such radiation (e.g., 5 rem). All of the studies have concluded that the doses received by most nuclear test participants are considerably less than these doses and considerably less than lifetime total doses from natural environmental radiation.

According to the National Cancer Institute, in a population of 10,000 individuals who received no known nuclear test or occupational radiation exposure, 1600 are normally expected to die of cancer. According to the National Academy of Sciences Committee on the Biological Effects of Ionizing Radiation (BEIR), if cancer mortality from high-dose cases can be extrapolated to low levels of radiation, then a dose of about one rem of whole body gamma radiation to the same 10,000 individuals would add only <u>one</u> additional cancer death. This is considered to be acceptable by current Federal occupational radiation exposure guidelines, and is less than many other occupational risks in

our society today. The average dose of about 0.6 rem to nuclear test veterans is well less than one rem.

Despite these reassuring medical and health findings, DNA continues to pursue every reasonable avenue available in the extensive effort to assess the incidence of radiogenic diseases among nuclear test participants. The Agency encourages all veterans to provide as much information and documentation as possible about themselves and their involvement in nuclear tests. This facilitates further research on their behalf and adds to the scientific knowledge about possible health effects from exposure to low-level ionizing radiation. Such information can be forwarded to Defense Nuclear Agency (ATTN: RARP/NTPR), 6801 Telegraph Road, Alexandria, Virginia 22310-3398, or one may call 1-800-462-3683. In Virginia, call (collect) 703-285-5610.