

# Causes of death among workers from the Paducah Gaseous Diffusion Plant

## Quick summary:

This study is the first to look at causes of death among workers at the Paducah Gaseous Diffusion Plant. This study was done to see if certain causes of death were higher among workers compared to the U.S. population.

The study found significantly lower death rates from all causes and cancer in general when compared to the overall U.S. population. However, slight increases were found for some specific cancers that some studies have associated with radiation exposure.

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## Why this study was done:

Over the years, the Paducah Gaseous Diffusion Plant (PGDP) has been used to enrich uranium for use in military reactors, nuclear weapons and commercial nuclear reactors. Plant employees are concerned that exposure to radiation and other chemicals may have affected their health. This study was done to find out if workers had an increased death rate compared to the U.S. population.

## Who did the study:

- University of Louisville
- University of Kentucky
- University of Cincinnati

Funding was provided by the National Institute for Occupational Safety and Health using Department of Energy congressional earmarked funds.

## Who was in the study:

Excluding contractors, 6,820 men and women worked at least 30 days at the plant between September 1952 and December 2003. Of those, the study included 6,759 workers who had complete work and personal information.

## How the study was done:

The study was done using personnel and available radiation exposure records. Because of this, workers in the study may not have been aware that they were included. The workers who are now deceased were found by searching death certificates. The cause of death was determined by what was listed on each death certificate; no other medical

records were reviewed. The number of deaths from each cause was compared with what would be expected in the U.S. population. The study did not look at workers who were sick or recovered from an illness.

Different jobs, levels of radiation exposure, and exposure to toxic metals were also looked at to see if these influenced death rates among PGDP workers. Arsenic, beryllium, chromium, nickel, and uranium were the five toxic metals looked at.

## Study results:

- Overall, there were significantly fewer deaths among these PGDP workers compared to the U.S. population. This is known by occupational health researchers as the “healthy worker effect”. Overall, 1,638 workers died out of the 6,759 in the study. This is less than the 2,253 that would have been expected in the U.S. population during the same period.
- The total number of cancer deaths among these workers was also lower than what would be expected in the overall U.S. population. Cancer was the reported cause of death for 461 PGDP workers. This is less than the 592 that would have been expected in the U.S. population.
- In looking at specific causes of death, there were slightly more deaths from lymphatic and bone marrow cancers than expected. These cancers included:
  - Leukemia (24 workers died, when only ~21 would have been expected)
  - Non-Hodgkin’s lymphoma (32 workers died, when only 22 would be expected)

- When looking at the 13 largest job categories, security workers at the plant had a 34% higher rate of death overall compared to the rest of the workers in the study. Deaths from non-Hodgkin's lymphoma were at a higher rate compared to the rest of the workers (non-Hodgkin's lymphoma accounted for 5 deaths among the security workers).
- In this study, the analysis of exposures to radiation and metals did not find any patterns of increased deaths.

### What does this mean:

This was the first study that looked at causes of death among workers at the PGDP. Based on this study, there is no increase in the overall death rate among workers compared to the U.S. population. A slightly higher rate of death from lymphatic and bone marrow cancers was found. Based on other studies, some of these types of cancers are thought to be associated with radiation exposure. Though a slightly higher rate of death from these types of cancer was found, the risk of dying from these cancers is still low. If you are worried about your health, share this fact sheet with your doctor. If you work at the plant, you could also contact the occupational health provider, Dr. Tanya Woods at (270) 441-6266.

If you work at the PGDP and are concerned about a hazard in your workplace, talk with your site's health and safety representative. NIOSH also has a program that can investigate worksite hazards, called the Health Hazard Evaluation (HHE) Program. Employees, authorized representatives of employees, or employers can request an evaluation of possible health hazards associated with a job or workplace. To learn more, visit [www.cdc.gov/niosh/hhe/default.html](http://www.cdc.gov/niosh/hhe/default.html)

### Additional information:

#### Medical screening programs

There are medical screening programs that you may be eligible for. These programs provide check-ups and tests, which can detect illness or disease early. To learn more, contact:

- Building Trades National Medical Screening Program  
Contact the program by calling 1-800-866-9663 or visit [www.btmed.org](http://www.btmed.org)
- Workers' Health Protection Program (WHPP)  
Contact WHPP by calling 1-888-241-1199 or visit [www.worker-health.org/index.html](http://www.worker-health.org/index.html)

#### Energy Employees Occupational Illness Compensation Program (EEOICPA)

In communicating these results with workers, NIOSH feels it is important to provide information about compensation programs available to workers.

If you, or a family member, developed an illness you think might be related to exposure from working at a Department of Energy (DOE) or Atomic Weapons Employer (AWE) facility, you may be eligible for benefits under the Energy Employees Occupational Illness Compensation Program Act of 2000 (EEOICPA).

EEOICPA is a compensation program administered by the Department of Labor (DOL) for individuals, or their eligible survivors, who worked in the production of nuclear weapons and who developed an illness as a result of their exposure to radiation or toxic substances while working at a DOE or AWE facility. To learn more, visit [www.dol.gov/esa/regs/compliance/owcp/eoicp/main.htm](http://www.dol.gov/esa/regs/compliance/owcp/eoicp/main.htm).

### Study manuscript:

Chan, C., Hughes, T.S., Muldoon, S., Aldrich, T., Rice, C., Hornung, R., Brion, G., and Tollerud, D.J. (2010). "Mortality patterns among Paducah Gaseous Diffusion Plant workers." Journal of Occupational and Environmental Medicine. 52(7):725-732.

#### Other related studies

Studies of the Portsmouth Gaseous Diffusion Plant:

<http://www.cdc.gov/niosh/oerp/ports.htm>

Studies of the Oak Ridge Nuclear Facilities:

<http://www.cdc.gov/niosh/oerp/oak.htm>