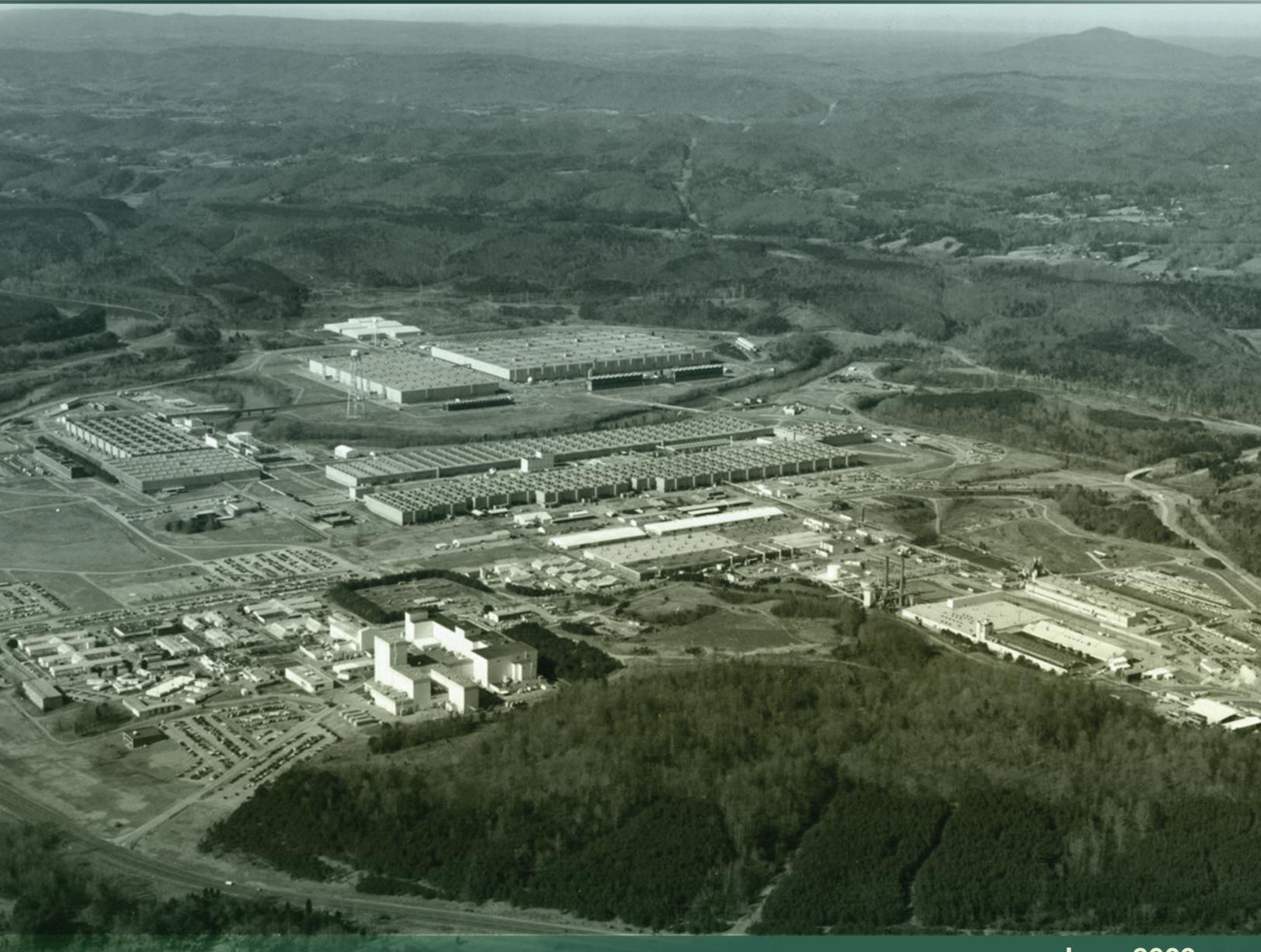


# Multiple myeloma: A study of K-25 workers



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## Summary:

This study is the first to look at radiation exposure to see if it may be linked to multiple myeloma among K-25 workers. We found workers who had swallowed or breathed-in radioactive particles had a 4% higher chance of dying of multiple myeloma compared to workers not exposed this way. We found no increased chance of multiple myeloma among workers who were only exposed to radiation that was outside the body.

## Why this study was done

Multiple myeloma is a rare type of cancer that starts in the bone marrow. Causes of this cancer are not known. Studies have been done to see if radiation exposure may cause this type of cancer in certain workers, such as radiologists, veterinarians, and uranium miners. The findings from these studies were not clear. Some found radiation exposure may cause multiple myeloma, others did not.

The K-25 site (also known as the Oak Ridge Gaseous Diffusion Plant) was used to enrich uranium, a radioactive material. Workers at K-25 may have been exposed to uranium. Because of this, we felt it was important to find out if workers from K-25 have a higher chance of dying of multiple myeloma.

## Who was in the study

Those in the study worked at K-25 for at least 30 days between 1945 and 1985. The total number of workers during this time was 47,941. By looking at death certificates through 1998, we found 98 workers died of multiple myeloma. We used work records to estimate how much radiation these workers were exposed to. We wanted to see if workers exposed to radiation had a higher chance of dying of multiple myeloma compared to other workers at K-25 who were not exposed.

## How radiation exposures happen

A person can be exposed *externally* to radiation just by standing near it. A person can be exposed *internally* by breathing in or swallowing radioactive particles in the air.

Particles can be absorbed through cuts or sores as well.

We were interested in studying all of these types of radiation exposure.

## Other exposures we considered

Besides looking at exposure to radiation, we also took into account how much mercury, nickel and trichloroethylene (TCE) workers may have been exposed to. These were used in large amounts at the site and may also cause cancer.

## What we found

Workers who had swallowed or breathed-in radioactive particles had a 4% higher chance of dying of multiple myeloma compared to workers not exposed this way.

There was no increased chance of multiple myeloma among workers who were only exposed to radiation that was outside the body.

## Important notes

At K-25, urinalysis was used to monitor internal exposure to radiation. For the workers with no urinalysis records, we used available work history records to estimate dose from internal exposures to radiation.

Our study did not include workers who currently have multiple myeloma. This is because the study design we used identified multiple myeloma cases using death certificates.

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## What you can do

Please know that the increased chance we found is relative to the normal chance of dying of multiple myeloma among workers at K-25. Because this is a rare cancer, the likelihood of dying of this cancer is still very low.

If you are worried about your health, share this fact sheet with your doctor.

There are also medical screening programs you may be eligible to participate in. These programs are free to workers who qualify. They provide check-ups and tests to allow for early detection of an illness or disease.

## Free medical screening programs available to workers

### Building Trades National Medical Screening Program

Contact the program by calling 1-800-866-9663 or visit <http://www.btmed.org>

### Workers' Health Protection Program (WHPP)

Contact WHPP by calling 1-888-241-1199 or visit <http://www.worker-health.org/index.html>

## Additional information

### Energy Employees Occupational Illness Compensation Program

As part of our communications with workers, we 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 about the program, call the EEOICPA Resource Center in Oak Ridge at 865-481-0411 or 1-866-481-0411. You may also visit <http://www.dol.gov/esa/regs/compliance/owcp/eeoicp/main.htm>.

### Centers for Disease Control and Prevention (CDC)

CDC is the federal agency that works to promote health and quality of life by preventing and controlling disease, injury, and disability. To learn more, visit <http://www.cdc.gov> or call 1-800-CDC-INFO.

### National Institute for Occupational Safety and Health (NIOSH)

NIOSH is the federal agency within CDC that is responsible for conducting research and making recommendations for the prevention of work-related injury and illness. To learn more, visit <http://www.cdc.gov/niosh>.

## Study manuscript

Yiin, J H; Anderson, J L; Daniels, R D; Seel, E A; Fleming, D A; Waters, K M; and Chen, P H. A Nested Case-Control Study of Multiple Myeloma Risk and Uranium Exposure among Workers at the Oak Ridge Gaseous Diffusion Plant. *Radiation Research* 171; 637-645.

This study was done by the NIOSH Occupational Energy Research Program (OERP) and was funded by the Department of Energy (DOE). For more information about the OERP or to obtain an electronic copy of this worker notification, visit: [www.cdc.gov/niosh/oerp/](http://www.cdc.gov/niosh/oerp/) or call 1-800-CDC-INFO