CDC Workplace Safety and Health

National Institute for Occupational Safety and Health Announcement of Findings

Portsmouth GDP Edition **October 2001**

Glossary of Terms

Cohort: A group of persons identified by common characteristics who are studied over a period of time.

External Radiation: Exposure which was measured by personal dosimeters worn on the outside of workers clothing.

Internal Radiation: Exposure to radioactive materials that have been inhaled or ingested by workers which was determined from the number of alpha counts in worker urine samples.

Healthy Worker Effect: Fewer deaths are observed for workers when compared to the U.S. population; usually due to the employment of healthy workers and the exclusion of the severely ill and chronically disabled from employment.

Hematopoietic: The system in the human body that forms blood. Diseases of this system include leukemias and multiple myeloma among others.

Dose Response: A relationship in which a change in the amount, intensity, or duration of an exposure is associated with either an increase or a decrease in risk of a specified health outcome.

Mortality Patterns of Uranium Enrichment Workers at the Portsmouth Gaseous Diffusion Plant

NIOSH Investigators: Robert Rinsky, Ph.D.; John Cardarelli II, Ph.D., CIH, PE; Steven Ahrenholz, Ph.D., CIH; Thurman Wenzl Sc.D., CIH; Richard Hornung, Dr.P.H.; Dianne Reeder; Kathy Waters; Patti Dill

Study Population: A total of 8,877 workers (both sexes and all races) employed for at least one day at Portsmouth Gaseous Diffusion Plant (PORTS) between September 1, 1954 and December 31, 1991.

How This Study Was Done: This epidemiologic study examined the causes of deaths among all PORTS workers employed by the facility between September 1, 1954 and December 31, 1991. Deaths among the workers were compared with rates for the general U.S. population. Possible relationships were evaluated for deaths from several types of cancer and exposures to ionizing radiation and certain chemicals (fluoride, uranium metal, and nickel). Based upon previous health studies of nuclear facility workers, including an earlier NIOSH investigation at PORTS, deaths from cancers of the stomach, lung, and the lymphatic and the hematopoietic systems including leukemia, were evaluated in more detail. The study report and findings were reviewed by experts outside NIOSH.

Study Findings: Approximately 88% of the cohort was still alive through the end of 1991. Overall cohort mortality was significantly less than expected, when compared to the United States population, as was mortality from all cancers. A total of 1,088 deaths from all causes occurred in this cohort through 1991. A total of 1,518 deaths could be expected based upon rates in the general U.S. population. The lower mortality among these workers is consistent with the healthy worker effect which is found in most occupational epidemiologic studies.

No statistically significant excesses in mortality from any specific cause were identified. Analyses of possible relationships between causes of death and the identified exposures failed to reveal any dose-response trends. For leukemia, no effect of cumulative exposure to either external or internal radiation was identified. Additionally, no dose-response relationships were observed for cancers of the stomach, lung, Hodgkin's disease, lymphoreticulosarcoma, and all cancers combined.

National Institute for Occupational Safety and Health NIOSH

Further NIOSH Information:

- For a summary of NIOSH research involving Department of Energy workers, visit online at: www.cdc.gov/niosh/2001-133.html

DOE Compensation Information:

- Questions regarding the DOE compensation program may be directed (toll free) to the DOE Office of Worker Advocacy at : (877) 447-9756, www.eh.doe.gov/advocacy
- Questions may also be directed (toll free) to the Department of Labor's DOE Compensation Initiative Office at: (866) 888-3322, www.dol.gov

This study was conducted by researchers at the National Institute for Occupational Safety and Health.

Worker deaths from cancers of the lympho-hematopoietic tissue, including leukemia, equaled U.S. rates. Stomach cancer deaths were greater than expected (12.7 deaths expected, 15 deaths found) but this difference was not statistically significant. Deaths from these cancers had been found to be slightly elevated in a previous NIOSH study of PORTS.

Study Limitations:

- The young average age of this cohort with 88% still living in 1991 made it difficult to fully assess patterns of death associated with work exposures.
- Estimated radiation and chemical exposures developed for this study are subject to error since monitoring results for chemicals and various forms of radiation were incomplete.
- Potentially important factors that may have an effect on the observed outcome, such as lifestyle factors (e.g., smoking), radiation due to medical procedures, and other workplace exposures could not be evaluated.

Study Advantages:

- A comprehensive exposure assessment was conducted, making use of nearly all health physics and industrial hygiene data from 1954 through 1991.
- The patterns of exposures used in this study were evaluated by experienced workers at the site. Analysis with these estimates increased the ability to detect associations between exposures and death.
- This study design was a good tool for evaluating the causes of death in workers with chronic low-level radiation exposures.

Important Announcements

NIOSH researchers will discuss study findings in a live video presentation from the Portsmouth Gaseous Diffusion Plant to the Paducah and Oak Ridge facilities on October 4, 2001, at 2:00 p.m., EDT. Broadcast of this presentation will be held at the Building X-100 Videoconference Room at the PORTS site. A second presentation at PORTS will be held from 6:30-8:30 p.m. at the Vern Riffe Vocational School. The presentation will be videotaped and made available at each of the sites. For more information please contact the Department of Energy (DOE) representative, Mr. Walter Perry at (865) 576-0885.

Questions concerning this study should be directed to NIOSH at (513) 841-4400. For a copy of the abstract or final technical report for this study, call 1-800-356-4674.

NIOSH/HERB Contact Points for Further Information...

National Institute for Occupational Safety and Health (NIOSH)
Division of Surveillance, Hazard Evaluations and Field Studies (DSHEFS)
Health-Related Energy Research Branch (HERB)

NIOSH-HERB MS R-44
4676 Columbia Parkway
Cincinnati, OH 45226

Phone: (513) 841-4400
Fax: (513) 841-4470