CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

QUESTIONS & ANSWERS

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Centers for Disease Control and Prevention,
National Center for Environmental Health (NCEH)

Fernald Risk Assessment Project – Draft Phase II Report

Phase II: Screening Level Estimates of the Lifetime Risk of Developing Kidney Cancer, Female Breast Cancer, Bone Cancer, and Leukemia as a Result of the Maximum Estimated Exposure to Radioactive Materials Released from the Fernald Feed Materials Production Center (FMPC)

Q: WHAT PROMPTED THIS PROJECT?

A: ***The mission of the Centers for Disease Control and Prevention (CDC) is to promote the health and quality of life of the public by preventing and controlling disease, injury and disability. In accordance with that mission, CDC has conducted its health research projects at Fernald to respond to community and congressional concerns about possible health effects from exposure to radioactive materials from the former Fernald Feed Materials Production Center (FMPC).***

Q: WHAT IS A RISK ASSESSMENT?

A: ***A risk assessment is the scientific analysis and characterization of adverse effects of environmental hazards. It involves a number of steps for addressing the potential human health effects. These involve data gathering and use of mathematical models to:***

- *Identify sources and types of hazardous materials and estimate the quantities released.*
- *Analyze the potential exposure pathways, or ways in which substances could be transported through air, water or soil to locations where humans could be exposed.*
- *Assess the possible harmful effects resulting from human exposure to the estimated concentrations of the substance in question.*
- *Estimate the increased risk of adverse health effects based on steps 1, 2 and 3.*

Q: WHAT IS THE GOAL OF THIS RISK ASSESSMENT PROJECT?

A: ***The goal of the Fernald Risk Assessment Project is to estimate human health risk for the community surrounding the former FMPC resulting from exposures to radioactive material released from the site from 1951 through 1988. This phase of the project provides screening level estimates of the lifetime risk of developing kidney cancer, female breast cancer, bone cancer or leukemia as a result of these past exposures.***

Q: WHY DOES THIS SCREENING LEVEL RISK ASSESSMENT ONLY FOCUS ON KIDNEY CANCER, FEMALE BREAST CANCER, BONE CANCER AND LEUKEMIA?

A: ***These four health outcomes were chosen for this report because they are perceived by the community to be related to past releases of radioactive materials from the FMPC. Also, biologic and other scientific evidence suggests that these cancers may be associated with the types of radioactive material released from the site from 1951 through 1988.***

Q: WHY ARE YOU FOCUSED SO MUCH ON URANIUM? WHAT ABOUT ALL THE RADON YOU TALKED ABOUT IN THE LAST REPORT?

A: ***Breathing radon gas and radon decay products emitted from the K-65 silos contributes very little to the radiation doses received by organs other than the lung. For these other organs, uranium, thorium, and other radionuclides released from the FMPC from 1951 through 1988 are primarily responsible for radiation dose.***

Q: WHY DIDN'T YOU GO OUT AND JUST COUNT THE NUMBER OF KIDNEY CANCER, FEMALE BREAST CANCER, BONE CANCER AND LEUKEMIA CASES THAT ALREADY OCCURRED IN THE STUDY AREA AND HOW MANY PEOPLE HAVE THESE CANCERS NOW?

A: ***Doing this is not as simple as it may seem and may not give us all the information we need to estimate risk. First, we would have to determine who lived near FMPC during the production years. Some of these residents may have died or moved away. Second, we would have to identify all the cases of kidney cancer, female breast cancer, bone cancer and leukemia that occurred among current and past area residents sometime from 1951 through the present. This would involve collection of data from the Ohio Cancer Incidence Surveillance System, death certificates and medical records, and possibly individuals themselves (or family members) if they were no longer residents. Finally, since death certificates and medical records do not provide information on factors such as length of residence and other modifiers of cancer risk such as smoking or diet, we would have to collect additional data. Because the risk assessment could be done more quickly, using existing data, it allows us the opportunity to respond to citizens concerns sooner.***

Q: WHAT DO YOU MEAN BY SCREENING LEVEL ESTIMATES OF LIFETIME RISK?

A: ***We refer to these as screening level estimates because we have tried to develop a "worst case scenario" in order to evaluate the cancer risk for a hypothetical individual who received a plausible maximum FMPC-related radiation dose. We translated our risk estimates for hypothetical individuals into an upper bound or worst case estimate of the number of cases of kidney, female breast, bone cancer and leukemia that may occur in the community as a result of FMPC radiation-related exposures. Our purpose in developing these screening level estimates was to provide residents with a reference point to evaluate their own potential FMPC radiation-related cancer risk and to guide CDC in future research and public health activities.***

Q: EXPLAIN THE RESULTS – SPECIFICALLY, WHAT DOES "THE UPPER BOUND ESTIMATE OF THE NUMBER OF CANCER CASES" MEAN?

A: ***The upper bound estimates of the number of cancer cases are worst case estimates of the number of cases that may occur over the lifetimes of the population exposed to radioactive materials released from the site during its production years. These upper bound estimates are based on the unrealistic assumption that all persons who resided within 10 kilometers of the facility received a maximum dose. The actual number of cases that may occur as a result of FMPC-related radiation exposure is likely to be lower than this upper bound estimate.***

Q: WHAT IS THE DIFFERENCE BETWEEN THE RISK NUMBERS IN THIS REPORT COMPARED TO THE RISK NUMBERS PROVIDED IN YOUR LUNG CANCER REPORT?

A: ***The key difference is that this Phase II report provides screening level estimates of the lifetime risk of developing kidney cancer, female breast cancer, bone cancer, and leukemia for persons who received a plausible value for the maximum exposure to radioactive materials released from the FMPC during its operating years. These estimates present a worst case scenario for the risk and number of cancer cases resulting from Fernald exposures and use possible, though unlikely, lifestyle assumptions to estimate maximum exposures (e.g. All meat consumed was contaminated by radioactive materials from the site). Our purpose in developing these screening level estimates was to provide residents with a reference point to evaluate their own potential FMPC-related cancer risk and to guide CDC in future research and public health activities.***

The goal in the Phase I lung cancer report was much different. It provided estimates of the lung cancer mortality risk. Its purpose was not to estimate an upper bound for the community's risk, but rather to estimate the range of possible FMPC-related lung cancer mortality risks that actually may occur based on realistic assumptions about community members' exposure to radioactive material released from the site from 1951 through 1988.

Q: WHY DID YOU USE DATA FROM OTHER POPULATIONS, SUCH AS ATOMIC BOMB SURVIVORS, TO COME UP WITH RISK ESTIMATES FOR THE FERNALD POPULATION?

A: ***To date, information on the relationship between radiation exposure and kidney cancer, breast cancer, bone cancer and leukemia comes from a compilation of evidence from other populations, especially the atomic bomb survivors and populations exposed to radiation for medical reasons. Epidemiologic data from these populations have been used by standard setting organizations and expert scientific review committees to estimate the increase in the lifetime risk of dying from cancer per unit of radiation dose (e.g. 1 sievert). As is commonly done in risk analysis and in radiation protection, we have relied on these existing estimates to develop our estimates of risk in the Fernald population. Our risk estimates are based on estimates of the maximum dose that may occur from exposure to radioactive materials released from the FMPC from 1951 through 1988.***

Q: WHY ARE YOU PROVIDING A RANGE OF NUMBERS INSTEAD OF JUST ONE NUMBER FOR AN ESTIMATE?

A: ***Because we cannot measure actual organ doses, nor count the actual number of cancers that result from exposure to radioactive materials from the former FMPC, our estimated number of FMPC-related kidney cancer, female breast cancer, bone cancer and leukemia cases must be made using mathematical models. Because these mathematical models are uncertain, we produce a collection of possible values for the estimated doses and risks. This collection of possible values is summarized using the median and the 90% credibility interval.***

Q: WHY CAN'T YOU MEASURE THE AMOUNT OF RADIATION IN MY BLOOD OR TISSUES AND SEE WHAT DOSE OF RADIATION I'VE RECEIVED?

A: ***There are blood tests that can determine if a person was exposed to potentially lethal levels of radiation (e.g., survivors of Hiroshima or Nagasaki, or cancer patients who have received radiation treatments.) These tests are completely insensitive at exposure levels below the lethal range (which is thousands of times higher than the maximum estimated exposure received at FMPC).***

Q: FROM THE NUMBERS YOU HAVE, HOW MANY OF US ARE GOING TO DEVELOP CANCER OF THE KIDNEY, FEMALE BREAST, BONE OR LEUKEMIA BECAUSE WE LIVED NEAR THIS GOVERNMENT PLANT?

A: ***Exposure to radioactive materials released from the former FMPC from 1951 through 1988 may result or may have resulted in 4 or less cases of kidney cancer, 3 or less cases of female breast cancer, 4 or less cases of bone cancer and 23 or less cases of leukemia over the lifetimes of 46,000 people estimated to have lived within 10 kilometers of the facility sometime during these years. These numbers of cases represent upper bound or worst case estimates in that they are likely to be larger than the true number of cases of these types of cancers that may occur in the assessment population as a result of their past exposure to radiation released from the FMPC.***

Q: YOU TELL US THAT THESE EXPOSURES OCCURRED DURING THE YEARS THE PLANT WAS OPERATING, YET YOU ARE PREDICTING RISK FOR A LIFETIME – HOW CAN THAT BE?

A: ***An exposure can cause changes in the body that many years or even decades later can develop into cancer. This is what is called disease latency. This is true for both radiation and chemical exposures. Most of the cancers will occur within the first 20-40 years after exposure, but a few can occur much later than 40 years. Our risk estimation allowed time for all possible cancers to develop.***

Q: DID YOU LOOK AT WHO MIGHT BE AFFECTED MORE BY EXPOSURES FROM THE PLANT, MALES OR FEMALES? ADULTS OR CHILDREN?

A: ***We included exposures to both children and adults and to males and females when we were developing our maximum dose estimates. However, because we were estimating the maximum dose, we did not develop separate estimates of the maximum dose and resulting risk for each of these subgroups.***

Q: IS IT POSSIBLE THAT THE HYPOTHETICAL MAXIMALLY EXPOSED INDIVIDUALS IN THE REPORT COULD REPRESENT A REAL PERSON WHO LIVED NEAR THE SITE?

A: ***It is possible, but unlikely. Consider some of the assumptions which were made to determine the risk of a hypothetical maximally exposed individual during the time period 1951-1988:***

- *Every single vegetable eaten by this individual was considered to be contaminated.*
- *All milk consumed by the individual was considered contaminated.*
- *All beef and chicken eaten were assumed to be contaminated.*
- *Every single egg eaten was considered to be contaminated.*
- *All fish eaten were considered contaminated.*

Q: WOULD YOU WANT YOUR CHILDREN TO GROW UP NEAR THE FERNALD SITE?

A: ***Currently, I do not believe the site presents a significant risk and I would have no problem moving my family here. Historically, however, I would not have wanted my children to grow up here, because, as a parent, any known risk to my family is too much risk.***

Q: WHAT ABOUT THE WORKERS' EXPOSURES? SURELY THEY HAD TO BE HIGHER? COMBINED WITH THEIR EXPOSURE FROM JUST LIVING NEAR THE PLANT, SHOULDN'T THEIR RISK OF DEVELOPING THESE CANCERS BE MUCH HIGHER?

A: ***Our report did not consider exposures workers may have received on the job. We are working with National Institute of Occupational Safety and Health to understand the implications of this risk estimation for workers.***

Q: ARE MY CHANCES OF GETTING ONE OF THESE CANCERS HIGHER BECAUSE MY WELL WAS CONTAMINATED BY RADIOACTIVE MATERIALS FROM THE SITE?

A: ***I cannot address your individual risk because there are a number of factors that influence your risk such as how much well water you drank, family history of cancer, etc. However, in our risk analysis we found that for a hypothetical individual residing close in and south of the site, exposure to contaminated well water increased the estimated maximum dose to the kidney, bone surface, and bone marrow. The estimated maximum dose to the bone marrow was 300% higher for a hypothetical individual exposed to contaminated well water than for the hypothetical individual who did not have this exposure. Risk increases with increasing dose.***

Q: WHAT KIND OF MEDICAL TESTS SHOULD I TELL MY DOCTOR TO GIVE ME TO TEST FOR URANIUM CONTAMINATION?

A: ***Since most of these exposures occurred in the past, the majority of the radioactive material that may have been taken in to a person's body (due to FMPC) should have passed through their body already. Small amounts of the uranium people may have taken in to their bodies due to exposures from the site could have gone to their bones and may still be there. However, it is important to note that individuals also have some uranium in their bodies as a result of ingesting naturally occurring uranium in food and water.***

While there are blood tests that can determine if a person was exposed to potentially lethal levels of radiation (e.g., survivors of Hiroshima or Nagasaki, or cancer patients who have received radiation treatments.), these tests are completely insensitive at exposure levels below the lethal range (which is thousands of times higher than the maximum estimated exposure received at FMPC).

Q: DOES THE CDC RECOMMEND THAT WOMEN WHO LIVED NEAR FERNALD DURING ITS YEARS OF OPERATION GET MAMMOGRAMS MORE FREQUENTLY?

A: ***Our risk analysis does <u>not</u> indicate that women who resided near the Fernald site some time from 1951 through 1988 need to be screened more frequently than is currently recommended for women in the United States by federal agencies and professional organizations. The Department of Health and Human Services' Preventative Services Task Force recommends that women aged 50-69 should be screened for breast cancer every 1-2 years with mammography alone or mammography and a yearly clinical breast exam. Because experts do not agree on the use of routine screening mammography and clinical breast exams in women aged 40-49 or women over age 70, younger and older women should consult with their health care provider about breast cancer screening. Women who are at high risk of disease because they have had a previous breast cancer or have a family history of breast cancer also should consult with their health care provider about breast cancer screening.***

Q: WILL THE PUBLIC GET AN OPPORTUNITY TO COMMENT ON THIS REPORT? WILL OUR COMMENTS REALLY MAKE A DIFFERENCE?

A: ***Yes. We are asking for public review and comment on the draft Phase II Fernald Risk Assessment Report. Your review and comment will help us ensure that we have captured and addressed community health concerns and questions--in the results provided in the report and also in our planning for future work at the FMPC site. All public and scientific review and comment will be considered in the final version of this Phase II Fernald Risk Assessment Report.***

The public review and comment period is 30 days, so all comments are due in to us by July 23, 1999. We will take your comments in any form-- in writing (by mail, facsimile or electronic mail) or by telephone. All public comment is due to Dr. Owen Devine, Centers for Disease Control and Prevention, Mail Stop F-35, 4770 Buford Highway, NE, Atlanta, GA 30341-3714, (770) 488-7040 (telephone), (770) 488-7044 (facsimile), ojd1@cdc.gov (e-mail) Public involvement is critical to this project-- as it is to all CDC's work in the community surrounding the FMPC. We encourage your input and attendance at the quarterly meetings of the Fernald Health Effects Subcommittee, public meetings and through telephone calls. All public meetings are held in the local area near the FMPC site and are routinely announced through public notices in two local newspapers. (To get on the Fernald mailing list, contact Dr. David Pedersen at Mail Stop R-19, Division of Surveillance, Hazards Evaluations and Field Studies, National Institute of Occupational Safety and Health, 4676 Columbia Parkway, Cincinnati, OH 45266-1998; phone: 513-841-4400.) Please feel free to ask questions or provide public comment at any time on any activity we are conducting or plan to conduct in the Fernald area.

Q: WHAT IS THE NEXT STEP IN THE PROJECT?

A: ***CDC/NCEH will continue to work with CDC's National Institute for Occupational Safety and Health, the Agency for Toxic Substances and Disease Registry, the Fernald Health Effects Subcommittee, and the Fernald community to prioritize work and make decisions as to additional technical work that may be needed.***

Q: HOW CAN WE INFLUENCE WHAT KINDS OF STUDIES ARE DONE NEXT?

A: ***The Fernald Health Effects Subcommittee advises CDC and the Agency for Toxic Substances and Disease Registry on the community's perspective of work that is needed for Fernald. Subcommittee meetings also provide a forum for community members to share their concerns with Subcommittee and agency representatives.***

Each year, CDC develops a research agenda that provides the framework for funding new projects. Advice obtained from Fernald Health Effects Subcommittee is taken into account in the development of this agenda and funding of new work.